

# THE AMERICAN JOURNAL OF PSYCHOLOGY

Founded by G. STANLEY HALL in 1887.

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Vol. XIII.

JULY, 1902.

No. 3.

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## A PRELIMINARY STUDY OF THE EMOTION OF LOVE BETWEEN THE SEXES.<sup>1</sup>

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The emotion of love between the sexes has as yet received no thorough scientific treatment. No writer so far as I can find has treated it from a genetic standpoint. The literature upon the subject is therefore meager. In his recent treatise upon "The Psychology of the Emotions," Ribot<sup>2</sup> remarks: "The sex-instinct, the last in chronological order with man and the higher animals, gives rise to the emotion of love with its numerous individual varieties. Most psychologists have been very sparing of details where it is concerned, and one might mention certain voluminous treatises which contain no mention of it. Is this through exaggerated delicacy? Or is it because the authors think that their place has been usurped by the novelists who have so obstinately confined themselves to the study of this passion? But the novelist's mode of analysis is different from the psychological mode, and does not exclude it." This author then devotes one chapter of eleven pages to the treatment of the sexual instinct, which includes

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<sup>1</sup> It should be borne in mind by the reader that this article is a preliminary study. It forms a part of one chapter of a relatively comprehensive study of some of the aspects of the Psychology of Sex. The writer appreciates the fact that there may be a number of questions suggested to the reader, the satisfactory answer to which cannot be found in the data submitted here. It may also seem that too much is made of some of the facts and that certain interpretations are unwarranted. This effect is almost always inevitably the result of isolating any phase of a subject from its settings in the whole to which it belongs. Several points merely touched upon in this article are to be exhaustively treated in other sections of the same study.

<sup>2</sup> Ribot: *The Psychology of the Emotions*, p. 248.

what he has to say upon sex-love. Brief as this treatment is, it is valuable, both for the facts it presents and for the problems it suggests. Havelock Ellis, who has perhaps done more than any other investigator in the field of the normal Psychology of Sex says in his most recent work:<sup>1</sup> "It is a very remarkable fact that although for many years past serious attempts have been made to elucidate the psychology of sexual perversions, little or no endeavor has been made to study the psychologic development of the normal sexual emotions. Nearly every writer seems either to take for granted that he and his readers are so familiar with all the facts of normal sex psychology that any detailed statement is altogether uncalled for, or else he is content to write a few introductory phrases, mostly made up from anatomic, philosophic and historical work.

Yet it is unreasonable to take normal phenomena for granted here as in any other region of medicine. A knowledge of such phenomena is as necessary here as physiology is to pathology or anatomy to surgery. So far from the facts of normal sex development, sex emotions and sex needs being uniform and constant, as is assumed by those who consider their discussion unnecessary, the range of variation within fairly normal limits is immense, and it is impossible to meet with two individuals whose records are nearly identical.

There are two fundamental reasons why the endeavor should be made to obtain a broad basis of clear information on the subject. In the first place, the normal phenomena give the key to the abnormal, and the majority of sexual perversions, including even those that are most repulsive, are but exaggerations of instincts and emotions that are germinal in normal human beings. In the second place, what is normal cannot be determined until the sexual life of a large number of healthy individuals is known, and until the limits of normal sexuality are known the physician is not in a position to lay down any reasonable rules of sexual hygiene."

Although very short, the analysis of the sex passions in adults by Herbert Spencer<sup>2</sup> in a part of one section in his "Principles of Psychology," is one of the best. Bain<sup>3</sup> devotes one chapter to the Tender Emotion which he makes include Sex-love, the parental feelings, the benevolent affection, gratitude, sorrow, admiration and esteem. A very few pages are given to sex-love proper. Very suggestive paragraphs bearing either directly or indirectly upon the subject are to be found in

<sup>1</sup> Psychology of Sex, Vol. III; Alienist and Neurologist, July, 1901, p. 500; American Journal of Dermatology, Sept., 1901.

<sup>2</sup> Principles of Psychology, Vol. I, pp. 487, 488.

<sup>3</sup> The Emotions and the Will, Chap. VII.



the works of such writers as Moll, Sergi, Mantegazza, James, Janet, Delboeuf, Feré, Boveri, Kiernan, Hartmann, Dessoir, Fincke and others. There is a vast amount of literature upon the pathological phases of the subject which is to be considered in another chapter.

The analyses thus far given by scientists are limited to the emotion as it is manifested in the adult. A few writers have referred to it in dealing with the psychology of adolescence, but in this connection refer to it as one of the many ways in which the adolescent spirit shows its intensity, turbulence and capriciousness. I know of no scientist who has given a careful analysis of the emotion as it is seen in the adolescent. It is true that it has been the chosen theme of the poet, romancer and novelist. But in the products of such writers we may look for artistic descriptions of the emotion and for scenes and incidents that very truly portray its nature; we have no right to expect a scientific analysis.

Adults need only to recall their own youth or to observe even briefly our grammar and high school boys and girls, to be convinced that love between the sexes is one of the emotions that become conspicuously apparent in early adolescence. This is what might reasonably be expected since the emotion is derived from the sex instinct, and pubescence marks the period of rapid acceleration in the growth of the sex organs. With the increase in size and vigor of the reproductive organs there comes the strong impulse for the organs to function. Before civilization developed the system of sex inhibitions that are considered an essential part of the ethical habits of our young people, the impulse to function was not repressed and pubescence marked the beginning of the distinctively sexual experience of both sexes. This was true of primitive peoples, and is generally true of the lower races that are living to-day. It is, however, not limited to these races. A very large percentage of both sexes of the civilized races begin their sexual life during early adolescence. This is particularly true of the male half of the races. The system of sex inhibitions which has gradually been developed by civilization has been along the line of evolution and has been doing away with promiscuity, polygamy and polyandry; it has been establishing monogamy and postponing marriage until a period of greater physiological and psychological maturity of both sexes. This same inhibition of early sex functioning has led to an increase in the prevalence of such substitutes as masturbation, onanism, pederasty, etc. Such facts bear upon the physiological results of inhibition. On the psychological side are to be mentioned courtship and those sex irradiations that have so profoundly influenced art, literature, religion, polite society, sports and in-

dustry. Many of the pathological sex psychoses, such as love for the same sex, erotopathia, sexual anaesthesia, etc., are to be explained, at least in part, by reference to the results of these social inhibitions trying to establish themselves.

The emotion of sex-love, so plainly traceable to the reproductive instinct, has its evolution in each normal individual. It develops through various stages as do other instincts. It does not make its appearance for the first time at the period of adolescence, as has been thought. Extended and varied experience in the public schools has furnished me with very favorable opportunities for making observations upon children who were allowed to mix freely regardless of sex. Most of the observations were made in schools which, with very few exceptions, had outdoor recesses during which the plays and games brought both sexes together under no restraint other than the ordinary social ones with perhaps some modifications by the particular regimen of the school concerned. The observations relative to the subject of love between the sexes were begun fifteen years ago. The first observations were made incidentally and consisted mainly of those love affairs between children, that needed my attention as one officially concerned. However, many were unquestionably innocent and harmless. My observations have not been limited to children under school conditions. About one-third of the number of cases which I have personally observed have been concerning children who were under the ordinary social or industrial conditions. During the past fifteen years, from time to time, I have collected as many as eight hundred cases observed by myself. In addition to these I have seventeen hundred cases as returns from a syllabus which I circulated among the students in my pedagogy and psychology classes at the Northern Indiana Normal School, at Valparaiso, Ind., in 1896. The syllabus is as follows:

I. *Love between children of about the same age and of opposite sex.* Give as completely as you can the details of any such cases you know of; age of each child; length of time the love continued; whether it was mutual; what broke it up; any signs of jealousy; any *expressions* of love such as confessions, caresses, gifts, etc.; any ideas of marriage; actions in presence of each other free or shy, when alone, when in the presence of others; any tendency of either child to withhold demonstrations and be satisfied to love at a distance; any other details you may have noticed.

II. *Love between children and those of opposite sex who are much older.* Give complete details on such points as indicated in I, with whatever differences the disparity in age would naturally make.

III. Give fully, frankly, and as accurately as you can the details of your own childish love affairs.

IV. Give your name (this may be left blank), age, and sex.

360 people reported more than 1,700 cases. With few exceptions those who reported had had experience in teaching. 355 gave accounts of their own childish love affairs. The other five stated that they did not recall any such experience in their own lives. The 1,700 cases include the confessions. Added to the 800 cases of my own collection there are in all more than 2,500 cases that form the basis of this study.

It will be seen that the syllabus calls for data of three kinds, viz., concerning (1) observed love between children of opposite sex about the same in age, (2) observed love between persons of opposite sex with disparity in ages, (3) personal confessions. The first two kinds of data were obtained by the objective method, while the last is obtained through retrospection. Having both observations and confessions many errors that could not otherwise be detected are eliminated since the two classes of material act, to a degree, as mutual controls. Each kind of data according to the first named classification has its particular virtue. The confessions (1) exhibit the continuity in the development of the emotion during the life-span of the individual as he sees it himself (enough cases (355) were given to make a reasonable allowance for individual variations); (2) they indicate the general prevalence of the emotion during childhood; (3) they reinforce observation in the same way that introspection always reinforces the objective method of study. In estimating the value of these confessions one must be mindful of the common defect of most auto-biographical statements, viz., that they are influenced by the almost irresistible tendency to write about one's self in a literary way and so touch plain facts as to make them less prosaic. The observations help us in eliminating this element of error. The data concerning the love that children have for adults of the opposite sex throw valuable light upon the nature of jealousy in children as it is much accentuated in these cases. They also show the effect of forcing the development of an emotion by a stimulus that is chronologically prior to the normal period of development. In the cases showing the love of the adult for a child are revealed facts bearing upon some forms of sexual perversion. In these cases the child is used as a means of escape for suppressed love. Love that normally should go out to an adult, is through some real or supposed necessity suppressed until it finally seeks quiescence through discharge upon a child or pet animal. This is not infrequent among women whose relatively passive role decreed by nature in love affairs has been exag-

gerated by society. The observations concerning love between children of opposite sex and about the same age aid us in determining the phase of the emotion's development that normally belongs to any given period of life; *i. e.*, there are many observations upon children who are five years old, or six, seven, eight, nine, etc., respectively, and these reveal the nature of the emotion that normally belongs to those years. The various kinds of observations extend over the entire periods of infancy, childhood, and into adolescence, and are very well distributed in number among the years of these periods, although more cases were reported for the years 4 to 8, and 12 to 15, both inclusive, than for the years of the period between 8 and 12. The reason for this becomes clearly apparent later.

Analysis of the data contained in all of this material reveals the fact that the emotion of sex-love may appear in the life of the child as early as the middle of the third year. From its appearance at this early age it can be traced in its development through five more or less well marked stages whose time limits are as follows: the first stage extending, as a rule, from the age of three years to the age of eight years; the second from eight to fourteen; the third from fourteen to maturity at about twenty-two in women and twenty-six in men; the fourth from maturity to senescence, whose limits vary widely; the fifth extending through senescence. Not every individual passes through all five stages. Individual differences also keep the time limits of the stages from being exact.

#### CHARACTERISTICS OF THE FIRST STAGE.

The presence of the emotion in children between three and eight years of age is shown by such action as the following: hugging, kissing, lifting each other, scuffling, sitting close to each other; confessions to each other and to others, talking about each other when apart; seeking each other and excluding others, grief at being separated; giving of gifts, extending courtesies to each other that are withheld from others, making sacrifices such as giving up desired things or foregoing pleasures; jealousies, etc. The unprejudiced mind in observing these manifestations in hundreds of couples of children cannot escape referring them to sex origin. The most exacting mind is satisfied when to these observations are added the confessions of those who have, as children, experienced the emotion to a marked degree of intensity, and whose memories of childhood are relatively distinct. We are prone to refer many of the manifestations enumerated to imitation. Imitation can account in part for the *form* in which the emotion shows itself, whose *presence* is established by the accumulation of a vast amount of

evidence. Imitation plays an important role in the development of the sex instinct, and love between the sexes as one of this instinct's derivatives, as it does with the development of most other instincts. It would be no more satisfactory to account for these manifestations by referring them to imitation than it would to account for the love for dolls, the instinct of hunting, the interest in "playing house" by reference to the same cause. When we observe in young puppies, shoats, squirrels, seals, grouse, partridges, field-sparrows, starlings, wood-larks, water-wagtails, goldfinches, etc., actions corresponding to these which I have mentioned in children, we have no hesitancy in referring them to the sex instinct for explanation.

So far as the observations given to me by others are concerned, with very few exceptions, they all report hugging, kissing and other means of affecting physical contact, as being indulged in by the child lovers. This is largely due to the fact that the observers took these actions as the main ones that indicate the presence of the emotion and reported no cases in which they did not occur. My own observations and some of the confessions show that although some form of embrace is general, it is not always present. Through all of the stages of the emotion's development the embrace in some of its forms is the most general means of its expression. A quotation from Groos<sup>1</sup> in this connection is deemed appropriate. In speaking of natural courtship he says: "But a scientific system of natural courtship of the various human races does not exist; nor, indeed, have we systematic observations of any one people. It is, therefore, impossible to affirm whether there are such things as instinctive gestures, expressions, caresses, etc., which all human beings recognize as sexual stimuli. From the little that is known it seems probable that the number of such tokens is not great,—even the kiss is by no means general! We can only be sure of a universal tendency to approach and to touch one another, and of a disposition to self exhibition and coquetry as probably instinctive and of the special forms which these tendencies take under the influence of imitation and tradition as secondary causes. Caressing contact may then be regarded as play when it is an end in itself, which is possible under two conditions. First, when the pursuance of the instinctive movements to their legitimate end is prevented by incapacity or ignorance; and, second, when it is prevented by an act of the will on part of the participants. Children exhibit the first case, adults often enough the second. It is generally known that children are frequently very early susceptible to sexual excitement, and show a desire for contact with others

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<sup>1</sup> *The Play of Man*, p. 254. New York, 1901.

as well as an enjoyment of it, without having the least suspicion of its meaning." In the cases in which I have recorded lifting each other as indicating sex-love, it was unmistakably apparent that the lifting was not a trial of strength but an indulgence in the pleasures of bodily contact, as was also true of the scuffling. In few, if in any of the cases which I have observed upon children of eight, have the participants been conscious of the meaning of their actions, although I have sometimes seen them attended by great sexual excitement. Schaeffer<sup>1</sup> believes that "the fundamental impulse of sexual life for the utmost intensive and extensive contact, with a more or less clearly defined idea of conquest underlying it," plays a conspicuous part in the ring fighting of belligerent boys. Bain<sup>2</sup> attaches very great importance to the element of physical contact in sex-love. He says: "In considering the genesis of tender emotion, in any or all of its modes, I am inclined to put great stress upon the sensation of animal contact, or the pleasure of the embrace, a circumstance not adverted to by Mr. Spencer. Many facts may be adduced as showing this to be a very intense susceptibility, as well as a starting point of associations. (1) Touch is the fundamental and generic sense, the first born of sensibility, from which, in the view of evolution, all others take their rise. (2) Even after the remaining senses are differentiated, the primary sense continues to be a leading susceptibility of the mind. The soft, warm touch, if not a first-class influence, is at least an approach to that. The combined power of soft contact and warmth amounts to a considerable pitch of massive pleasure; while there may be subtle influences not reducible to these two heads, such as we term, from not knowing anything about them, magnetic or electric. The sort of thrill from taking a baby in arms is something beyond mere warm touch; and it may rise to the ecstatic height, in which case, however, there may be concurring sensations and ideas. Between male and female the sexual appetite is aroused. A predisposed affection through other means, makes the contact thrilling. (3) The strong fact that cannot be explained away is, that under tender feeling there is a craving for the embrace. Between the sexes there is the deeper appetite; while in mere tender emotion, not sexual, there is nothing but the sense of touch to gratify unless we assume the occult magnetic influences. As anger is consummated, reaches a satisfactory term, by knocking some one down, love is completed and satisfied with an embrace. This would seem to show that the love emotion, while fed by sights and sounds, and even by odors, reaches its cli-

<sup>1</sup> *Zeitschr. f. Psychol. u. Physiol. d. Sinnesorgane*, Vol. II (1891), p. 128. (Quoted by Groos.)

<sup>2</sup> *The Emotions and the Will*, pp. 126, 127.



max in touch; and, if so, it must be more completely identified with this sensibility than with any other. In a word, our love pleasures begin and end in sensual contact. Touch is both the alpha and omega of affection. As the terminal and satisfying sensation, the *ne plus ultra*, it must be a pleasure of the highest degree." While it is the contact through the sense of touch that acts both as the most natural and most complete expression of love between the sexes and a powerful sexual excitant, there is a contact of the eyes of adolescent and adult lovers,—a sort of embrace by means of the eyes—that is as exciting to many as contact through touch.

The pleasure derived from hugging and kissing, etc., in children who have the emotion in this first stage of its development, is not specifically sexual except in some cases which I am inclined to consider as precocious. Normally, there appears to be no erethism of the sexual organs during the process of love-making. But erethism, as we shall see in another chapter upon the analysis of the sex impulse, is not confined to the sexual organs, but is distributed throughout the entire body, especially through the vascular and nervous systems. In these children there is a state of exaltation, indeed as yet not comparable in intensity to that of the adolescent or adult, which is, nevertheless, erethistic in its nature. It is massive, vague, and generally distributed throughout the body. In some cases there is specific sexual excitement with erections of the penis and hyperæmia of the female genitalia. Such phenomena are seen only in the cases that seem to me to be precocious. This point will be more fully treated in the chapter referred to above. Suffice it to say here that in love between the sexes at this early period or in the next following, the physical sensations of sexual excitement are generally wholly wanting, or if present are entirely unlocated. Love between children of the opposite sex bears much the same relation to that between adults as the flower does to the fruit, and has about as little of physical sexuality in it as an apple-blossom has of the apple that develops from it.

The love demonstrations of children in the first stage of the emotion's development are generally spontaneous, profuse, and unrestrained. There is an absence of shyness, of any sense of shame, of the feeling of self-consciousness. The children have as yet no notion of the meaning of sex. Their naïvete in this regard has not been destroyed by the social suggestion that such actions are wrong and vulgar. They are natively happy and free in their ignorance. The individual differences among children are as great in their experiencing and manifesting this emotion as they are in any other phase of life, so not infrequently we find children under eight years of age who are shy,



repressive and self-conscious in regard to their love actions. The same children are shy and repressive in other things. It is more of a general disposition than a specific attitude toward this one emotion.

The giving of gifts and the sharing of choice possessions is very common. The emotion in its earliest form introduces the element of self-sacrifice for the loved one that is inseparable from the emotion in all of its normal stages of development. It likewise introduces the intense selfishness that comes from the desire to monopolize the allegiance of the one loved. An only child, who as a rule is very selfish and will not share any of his possessions with others, readily gives up a liberal part to the lover. During the earlier years of this stage the gift is appreciated for its inherent value; it is good to eat, or pretty to look at, or has some other real value. This inherent value continues to be an element of appreciation in lovers's gifts throughout life. It is given by the lover as an expression of his love, and so received and prized by the sweetheart. Everything else being equal, the greater the real value the more satisfactory is the love expression to both. In the 6th and 7th years there appears unmistakable evidence of acquired value in the presents. They become of value because the lover gave them and, on account of their associations, are preserved as keepsakes. As early as the 6th and 7th years presents are taken from their places of safe keeping or where they are on exhibition as ornaments, and kissed and fondled as expressions of love for the absent giver. This is interesting as evidence of love-fetichism appearing in early childhood.

The emotion otherwise affects the moods and disposition of children. Refractory children, whose parents manage them with difficulty, become docile and amiable under the influence of the sweetheart or lover. Boys who, at other times, are cowards will fight with vigor and courage when their love is concerned. Children that have a sociable disposition sometimes become exclusive and abandon all other playmates for the chosen one, and cannot be induced to play with any one else. Ideas of marriage are often present, but they are vague and are present through social suggestion. The general attitude is represented by the testimony of one woman who stated that she had no definite idea of marriage at the time of her earliest childish love affair, but that she had a vague feeling that she and her little lover would always be together, and this feeling was a source of pleasure. Certainly children under eight have little foresight; they are chiefly absorbed in the present whose engrossing emotions give no premonition that they will ever change.

Beauty begins to be a factor in the choice of a sweetheart

among the children in this first stage. The most beautiful, charming, and attractive little girls are the ones who are favored. This element becomes much more conspicuous in the later stages. Jealousy is present from the first. It is more pronounced in the cases of love between children and adults of the opposite sex on account of the child's being less able to monopolize the attention of the adult and on account of the precocity of the child concerned in such cases. A fuller discussion of jealousy belongs in another section of this study.

#### TYPICAL CASES.

Case 1. Boy 3, girl 5. Love is mutual. When in a large company of children they will always separate themselves from the others and play together. Never tire of telling each other of their love. Delight in kissing and embracing, and do not care who sees them.

Case 2. B. 5, g. 4. Began at ages given and still continues, two years having gone. Are often seen hand-in-hand; are very jealous of each other. Boy more backward than girl. Will not play with other children when they can be together.

Case 3. B. 3, g. 3½. Have been deeply in love since their third week in kindergarten. Rose not so jealous as Russel. She always watches for his coming, and runs to meet him the moment he enters the room. They sit together at the table and in the circle, and cry if separated. They are very free and unrestrained in showing their love by kissing, hugging, and by many little attentions.

Case 4. B. 3, g. 3. My little nephew of three and a little neighbor girl of the same age had a most affectionate love for each other, and were not at all shy about it. They would kiss each other when they met, and seemed to think it all right. The little boy used to tell me that they would marry when grown. This continued about two and a half years; then the girl's parents moved away, much to the grief of both children. The little boy would often climb up and take the girl's photograph from the mantle and kiss it.

Case 5. B. 3, g. 3. My nephew of three manifested an ardent passion for a small girl of about the same age. He followed her about with dog-like persistence. Being an only child he was very selfish, never sharing anything with other children. But Bessie became the recipient of all his playthings. His hoard of treasures was laid at her feet. Nothing was good enough for her, nor could he be dressed fine enough when she was around. On one occasion, a large boy picked Bessie up to fondle her, whereupon her jealous lover seized a hatchet and attacked his rival. He imperiously demanded a dollar from me one day in order that he might buy Bessie and have her 'all for his own.' He is now six, and loves her as much as ever.

Case 6. I know of two young people who have been lovers since babyhood. As they grew up their love for each other assumed different aspects. During the first seven years of their lives their love was open and frank, showing no restriction of the regard they felt. Caresses and embraces were indulged in as freely and unrestrictedly as might have been between two little girls. But when school life began and they became exposed to the twits and teasings of their playmates there developed a shy timidity and reserve when in the presence of others. Though they have been separated for long periods at different times their love has continued.

Case 7. Both about five years old when they first showed signs of love that I observed. May have begun earlier. Lasted four years.

Broken up by girl's parents moving away. Love was mutual without any signs of jealousy that I could see. Exchanged gifts, such as candy, nuts, flowers, etc. Their actions at first very free either when alone or in the presence of others. Later they became somewhat shy in the presence of others, but free when alone. Upon the girl's moving away the boy showed very deep feeling of sorrow. Do not know about the girl.

Case 8. My little brother at the age of four was very much in love with a little girl two years of age. He used to lead the little girl around, caress her tenderly, and talk lovingly to her. He always divided with her the playthings he most appreciated. He often said he expected to marry her. While the little girl did not object to his demonstrations, she seemed to care more for a young man thirty-three years of age, and called him her sweetheart. The little boy became jealous, and finally gave her up. After they entered school together the little girl became very fond of my brother, and always managed to sit or stand next to him in the class if possible, but he had lost all interest in her, and never cared for her again.

Case 9. B. 6, g. 5. They had been lovers for about two years. They did not get to be together often since they lived in different towns. Their families were relatives and exchanged visits. Upon one occasion when of the age indicated above they met at the home of Jeaness's grandfather. Edgar came late. Jeaness was seated upon a hassock in the parlor where there were several guests. Upon Edgar's entering the door, she saw him and, as her little face beamed with evident delight, she arose and met him in the middle of the room. They were immediately in each others arms. Edgar's mother, seeing the vigor with which he was hugging Jeaness, said to him with concern: "Why, Edgar, you will hurt Jeaness." Jeaness, who evidently was better able to judge, archly turned her head and with a smile that meant much, said: "No, he won't."

Case 10. B. 2, g. 2. One afternoon last summer two of my little cousins, Florence twenty-three months old and Harold two years old, were spending the day at my home. They had never met until that day. Florence is an only child and is inclined to have her own way, and is n't willing to give up to other children. Harold has rather a sunny disposition. They had not been with each other more than an hour before they were sitting on the porch and Florence had her arms around Harold. She was very willing to give up to him and share all she had. They played together the remainder of the day, and were very affectionate. Ever since then they have been very devoted to each other, and it is very beautiful to watch them in all their little ways of indicating their love for each other.

Case 11. I attended a wedding last June which was the outcome of a striking illustration of this love. I will tell the story as the bride's mother told it to me. "This does not seem like a marriage to me but just one more step in a friendship which began when Minnie and Theo were babies. Before either could walk they would sit on the floor and play with each other—never having any trouble over playthings, but sharing everything alike. Theo would break bits of cake and put in Minnie's mouth, and then both would laugh as though it were a great joke. If they were separated both would cry. As they grew up the friendship grew stronger, and Theo always called Minnie his 'little wife.' At school they were always lovers, and when we moved here it was understood that when Minnie was twenty-one Theo should come for her. During their entire lives I do not know of a single quarrel between them."

Case 12. One bright morning I noticed a little boy sitting in front

of me who had not been there before. He turned around occasionally to look at me, and presently smiled. Of course I returned the smile, thinking that he was the sweetest little fellow that I had ever seen. This was the beginning of a love that lasted for several years. He was six, and I was the same age. On the next day he brought me a pretty picture, and after that paid so much attention to me that he was soon acknowledged to be my lover. Neither of us was the least bit shy over it. He did not care to play with the other boys and I did not care to play with the girls. We were not contented unless we were together. He freely confessed his love to me and confided all of his joys and sorrows in me. For three years and more he seemed to care as much for me as I did for him. When he came to our home to play with my brothers he usually forgot them and played with me. At dinner mamma always seated us side-by-side. We planned our marriage; his father who was a minister was to perform the ceremony. We discussed wedding dresses, bridesmaids and breakfasts with great seriousness. One day,—the fatal one to my childish happiness, a new girl came to school. I could not help noticing how often his eyes turned from me to her, and feared a rival from the first. He wanted her to play with us, and although I far rather would have preferred being alone with him, I hid my feelings and asked her. I tried to treat her kindly because I knew that it would please him. One day he asked me with great hesitation if I objected to his having two sweethearts. I smothered my jealous feelings and replied that I did not if he would marry *me*. He told me that he would, that he loved me,—in a way that was a compensation for my sacrifice. For some time the other girl and I got along very well as sister sweethearts; but I soon saw that she was receiving all of the caresses, and I concluded that I would not have it so. We had an interview. He said that he still loved me, but he gave me plainly to understand that he would be pleased to have me withdraw. Of course I did so, but was determined never to let either of them know that I cared. After a time they grew tired of each other, and he came to ask my forgiveness and make up, but by that time I had an older and as I thought better sweetheart; so he was left to repent his rash action while sweetheart number two captured some one else more suited to her taste.

#### CHARACTERISTICS OF THE SECOND STAGE.

The second stage in the development of the emotion of sex-love extends in time from the eighth year to about the twelfth year in girls and to the fourteenth year in boys. It is characterized by the appearance of shyness, of modesty, especially in girls, of self-consciousness and consequent efforts toward self-repression; by the inhibition of the spontaneous, impulsive love-demonstrations so freely indulged in during the previous stage. The boys are more secretive than the girls, but the tendency to conceal the love is present in both. This is the reason why fewer returns came for the years eight to twelve than for the years before and after this period. The children were to a degree successful in hiding their love and so passed unobserved. To the observer who does not depend upon the more demonstrative signs but who sees the less obvious but equally indicative ones, the emotion is easily detected. There is a conspicuous absence of pairing. The lover and sweetheart

are not often seen alone together. On the other hand, they are much confused and embarrassed when circumstances do bring them into each other's presence. Mutual confessions are seldom made,—at least, not directly, face to face. Some confess to friends, but this is usually done very reluctantly. Some confess through notes delivered by friends, or passed in some secret way; some reveal it by defending the sweetheart when she is being "talked about," in many of which cases boys fight most spiritedly for the honor of the one they love. Some never confess,—neither to friends nor to lover. Some boys deny that they are in love and speak slightly about their sweetheart, but afterwards confess. Then there are the revelations through gifts that are nearly always delivered in some secret manner, in many instances of which the giver leaves no clue that would reveal his identity; in other instances cards or notes are left, but it is rare to find lovers in this stage giving gifts face to face. Another indication that will not escape the close observer and which the confessions especially reveal, is that of the boy lover off at a distance, "feasting his eyes" upon every movement of his "girl" who may know absolutely nothing about his devotion. He may be seen following her about the playground or along the street, always, however, at a safe distance. Although modesty shows itself as a characteristic trait of the girl even at this early age, she is on the whole more aggressive in these early love affairs than the boy and less guarded about revealing her secret. However, the impulse to conceal the emotion, —to inhibit its direct manifestations—is fundamental to this stage of the emotion's development in both sexes and is, as we shall see later, of the deepest significance.

As in every other field of investigation, so here, we find that not all of the facts conform to our classification. Thus occasionally couples between eight and twelve or fourteen years of age are found who enjoy each other's company and so pair off and freely express their feelings as they do in the previous stage and also in the one that follows. The boys of these couples are generally those of effeminate tendencies who have been accustomed to play with girls instead of with boys. They are never very highly respected by the other boys, and later, at adolescence, are tolerated by the girls rather than respected and sought by them. Again there are individuals who are very timid in their general disposition, and are consequently undemonstrative and inhibitive at all times.

We have emphasized the fact that children that have sex-love in this second stage of its development, as a rule, avoid all direct expressions of their feelings and that lovers are awkward, embarrassed, self-conscious and ill-at-ease in each other's presence. This is true when the conditions are such that their

personalities meet in mutual recognition without a third thing as a shield. They are not yet in that stage of development wherein they, themselves, become the chief objects of conversation and wherein endearments and compliments become the chief stock-in-trade. However, the emotion has its expression indirectly through games, plays and other incidents that can be used as masks. Instead of direct contact of personalities through the love confession as such, it is long-circuited through some conventionality. In this regard the games of children are used very effectively. The following games are the ones which I have personally seen used oftenest: Post-office, Clap-in-clap-out, Snap-and-catch-it, Skip-to-my-Lou, Way-down-in-the-Paw-Paw-Patch, King-William, London-Bridge, Thread-the-Needle, Picking Grapes, Digging-a-Well, Black-Man, Prison-Base, Tag, All-I-Want-is-a-Handsome-Man, Green Gravel, Down-in-the-Meadow, All-Around-this-Pretty-Little-Maid. These are merely the ones that have seemed favorites and by no means exhaust the list of love games that I have seen used. Out of eighty-three games of Washington (D. C.) children reported in the *American Anthropologist*, by W. H. Babcock,<sup>1</sup> as many as thirty are love games. In this, as in the previous stage, the embrace is the most important love expression and stimulus. But in this stage it takes on disguised forms or is excused by the ceremony of the games. Some are kissing games, *e. g.*, Post-Office, Paw-Paw-Patch, King William, Picking Grapes, Digging-a-Well, etc.; some are hugging games, *e. g.*, London Bridge, Thread-the-Needle, etc., and some involve both hugging and kissing, *e. g.*, Green Grows the Willow Tree. The kiss is not the frank love kiss given and received as such, but one called for by the rules of the game. This makes the kissing relatively impersonal and enables the young lovers thoroughly to enjoy the love communication without the awkward embarrassment that would come to them if the expression were not thus long-circuited through the game. The charm of the whole thing is in the fact that under the guise of a ceremony love has its way.

It will be helpful here to give a brief analysis of a few of the games as types. King William is a choosing and kissing game, involving among its details, the following lines:

King William was King James's son,  
Upon a royal race he run;  
Upon his breast he wore a star,  
That was to all a sign of war.  
Go look to the east, go look to the west  
And choose the one that you love best,

<sup>1</sup>*American Anthropologist*, Vol. I, pp. 243-284. Also see Lippincott's Magazine, March and September, 1886.



If she 's not there to take your part,  
 Choose the next one to your heart.  
 Down on this carpet you must kneel  
 As sure as the grass grows in the field.  
 Salute your bride and kiss her sweet,  
 Then rise again upon your feet.

The game is played by an equal number of couples and one odd boy who is King William. With hands joined, all forming a circle with King William in the center, the sentiment of the lines is acted out to music, thereby adding the charm of rhythmic dance which is so pleasurable intoxicating to the young and which has been taken advantage of by lovers during all ages. At the conclusion of the lines, King William joins the circle, leaving his bride to choose as the lines are sung again, and so on.—Post-Office is another one of the most popular kissing games. It is an indoors game and requires two rooms, one to be used as the post-office, the other as an assembly room for the girls and boys. One of the number is chosen to be postmaster, and is stationed at the door of the post-office; another is elected to start the game by entering the post-office, closing the door and indicating to the postmaster the one for whom there are letters and the number of letters. This is then announced in the assembly room by the postmaster, and the girl (if it was a boy who started the game) is expected to respond by coming to the post-office and getting her mail, which means granting a kiss for each letter. She then remains in the post-office to indicate her choice to the postmaster, while the boy joins the others in the assembly room, and the game thus goes on indefinitely. The postmaster is usually granted, as his fee, the privilege of kissing each girl whose mail he announces. Picking Grapes is a game that calls for as many kisses as there are bunches to be picked. It further involves the holding of hands, and is not infrequently so arranged as to have the boy's arms about the girl's waist. Digging a Well is similar to Picking Grapes, and calls for as many kisses as there are feet in depth to be dug. In competition games where forfeits are sold there is no limit to the devices for indirect love expressions except the fertility and ingenuity in invention of the young people, and every one knows that in this particular regard their resources are well nigh inexhaustible. London Bridge is made use of to satisfy the hugging impulse. The game is played as follows. Two leaders agree upon two objects, for example, a horse-and-carriage and a piano,—as badges of their respective parties. Then they join hands and raise them to form an archway that represents London Bridge. The others in the game form a line and pass under this archway while all are singing:

You stole my watch and broke my chain,  
 Broke my chain, broke my chain,



You stole my watch and broke my chain,  
So fare you well my lady love.

Off to prison you must go,  
You must go, you must go,  
Off to prison you must go,  
So fare you well, my lady love.

The leaders may at any time let their hands drop down and catch any one in the line that is passing through. The procession then stops and the prisoner is asked in a whisper, "Which would you rather have, a horse-and-carriage or a piano?" According to the choice he or she passes around and locks his hands about the leader's waist. The second one who makes the same choice locks her hands about the first one's waist, and so on till all have in turn been made captive and have joined one or the other side. The two lines, whose leaders still face each other with hands joined, are now ready for the struggle that ends in the downfall of London Bridge. The following stanzas are sung, at the conclusion of which the pulling begins that usually results in a general downfall and tumbling over one another:

London Bridge is falling down,  
Falling down, falling down,  
London Bridge is falling down,  
So fare you well, my lady love.

What will it take to build it up,  
Build it up, build it up?  
What will it take to build it up?  
So fare you well, my lady love.

Lime and water will build it up,  
Build it up, build it up,  
Lime and water will build it up,  
So fare you well, my lady love.

Blackman is a catching and clutching game, and furnishes the opportunity for hugging long enough for saying, "One, two, three, pretty good blackman for me;" and it often happens that this is not said as rapidly as it could be,—especially if it be the favored one who is caught. Of course there is much promiscuous catching, and the game is satisfying other instincts than that of love, for instance the instinct of pursuing and catching; but it is quite noticeable that the boys have their favorite girls and catch them first, often showing jealousy if the girls are caught by any one else. The girls are often aggressive in selecting boys to catch in the event that they themselves are caught first. Prison-Base and Handkerchief are pursuing and touching games, and furnish opportunity for indirect love confessions. Skip-to-My-Lou involves the choice of "My Lou" together with skipping with her, which is done

while holding her hand or with arm about her waist as in round dancing. Green Grows the Willow Tree, involves holding hands, hugging and kissing. It is a ring game, with the one who does the choosing placed in the middle of the ring. The following is the song that furnishes the suggestions for the acting that accompanies it:

Green grows the willow tree,  
 Green grows the willow tree.  
 Come my love where have you been?  
 Come and sit at the side of me.  
 O, how she blushes so!  
 Kiss her sweet and let her go,  
 But don't you let her mother know.

Tag and I Spy are other games that furnish opportunities for love to discriminate in favor of its chosen ones. In fact there is scarcely a social game indulged in by both sexes wherein the incidents are not turned to the emotion's account by the young lovers. It must not be understood that all of the children who take part in these games are to be considered as lovers. As was suggested above the games may appeal to many other instincts and be indulged in on that account rather than on account of the love sentiment that characterizes them. On the other hand many of the games whose content does not suggest love may be turned into a love opportunity and expression.

The routine of the school furnishes other opportunities that are taken advantage of. Lovers will manage some way to sit or stand together, and are thrilled by touching. One boy who sat behind his sweetheart would place his arm along the back of the desk where she would come in contact with it. Others carry on their courtship by touching their feet under the desks, etc. It is common to see favoritism in recitations wherein pupils make the corrections; the lover seldom corrects the sweetheart, and *vice versa*. In contests such as spelling, words are purposely misspelled in order to favor the sweetheart or to keep from "turning her down." The eye glance is another means as efficacious with children as with adults. One pair of young lovers, whose unsympathetic teacher forbade their looking at each other, brought hand mirrors by means of which they continued to exchange their "love messages."

Few teachers complain of the love affairs of children in these first two periods as interfering with school work,—except when one of the lovers is absent. A score or more of the observers assert that during the absence of one of the lovers, the other does not do as good work and often becomes moody and irritable. On the other hand it very materially quickens the efforts of many who want to appear well before their lovers.

One boy, nine years old, who had been quite lazy and was looked upon as being rather dull, braced up and for two years led his class, in order, as he said, "to win his Ottilia." During the adolescent stage that follows this the emotion becomes so intense and all absorbing as to interfere very much with school work, or with anything else that requires application.

Akin to the disturbance caused by the absence of the lover from school is the grief that comes from being more or less permanently separated, as by moving away or by the death of one. In some instances the grief is very intense and protracted. Four cases of attempts at suicide are reported: one boy eight years old; another nine; a girl nine and another eleven. Six cases of nervous illness are reported as due, either to separation or jilting. Ordinarily, however, weaning is comparatively an easy matter.

Teasing breaks up many of these love affairs, and not infrequently causes the lovers to hate each other; in which case they childishly look upon each other as the cause instead of the occasion of the torment. Also under the spur of the taunts of mates the lovers are stimulated to say things to or about each other that lead to estrangement. In some instances, however, the persecution is taken as a sort of martyrdom and is enjoyed. Jealousy is another potent factor in separating these young lovers. Teasing is not the primary cause of the tendency to conceal the emotion.

The season of the year seems to have its effect upon the intensity of the emotion of sex-love among children. One teacher from Texas, who furnished me with seventy-six cases, said that he had noticed that the matter of love among children seemed "fairly to break out in the spring-time." Many of the others who reported, incidentally mentioned the love affairs as beginning in the spring. This also agrees with my own observations. It may partly be accounted for by the fact that during the winter months the children have much less freedom in playing together, and hence fewer opportunities for forming and showing preferences. On the other hand the suggestion inevitably occurs that there is some connection between this and the pairing season among animals and the sexual periodicity among primitive peoples.

"Showing-off" as a method of courtship is not only as old as the human race, but is perhaps the most common one used by animals. While the complete discussion of this topic is reserved for the chapter upon courtship, the picture of love as it is experienced by the young people in this second stage would not be complete without at least a passing reference to it. It constitutes one of the chief numbers in the boy's repertory of love charms, and is not totally absent from the girl's. It is

a most common sight to see the boys taxing their resources in devising means of exposing their own excellences, and often doing the most ridiculous and extravagant things. Running, jumping, dancing, prancing, sparring, wrestling, turning hand-springs, somersaults,—backward, forward, double,—climbing, walking fences, singing, giving yodels and yells, whistling, imitating the movements of animals, “taking people off,” courting danger, affecting courage, are some of its common forms. I saw a boy upon one such occasion stand on the railroad track until by the barest margin he escaped death by a passenger engine. One writer gives an account of a boy who sat on the end of a cross-tie and was killed by a passing train. This tendency to show off for love’s sake, together with the inability to make any direct declaration, is well illustrated in the love affair of Piggy Pennington, King of Boyville.<sup>1</sup> “Time and time again had Piggy tried to make some sign to let his feelings be known, but every time he had failed. Lying in wait for her at corners, and suddenly breaking upon her with a glory of backward and forward somersaults did not convey the state of his heart. Hanging by his heels from an apple tree limb over the sidewalk in front of her, unexpectedly, did not tell the tender tale for which his lips could find no words. And the nearest that he could come to an expression of the longing in his breast was to cut her initials in the ice beside his own when she came weaving and wobbling past on some other boy’s arm. But she would not look at the initials, and the chirography of his skates was so indistinct that it required a key; and, everything put together, poor Piggy was no nearer a declaration at the end of the winter than he had been at the beginning of autumn. So only one heart beat with but a single thought, and the other took motto candy and valentines and red apples and picture cards and other tokens of esteem from other boys, and beat on with any number of thoughts, entirely immaterial to the uses of this narrative.” This “showing-off” in the boy lover is the forerunner of the skillful, purposive and elaborate means of self-exhibition in the adult male and the charming coquetry in the adult female, in their love relations.

Another kind of indirection that is very interesting is that of a boy who ostensibly is talking to one, but everything which he is saying is intended for another. This is sometimes extended into a sort of pleasant teasing and scuffling in which the very one whom he wants to touch is very carefully avoided. A further phase of the same thing is shown by the embrace or caress that is given to one while the emotional discharge goes out to some one else; as for example, a boy under the influence of a

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<sup>1</sup> McClure’s Magazine, February, 1897, p. 322.

meeting with the girl whom he had begun to love but to whom he had made no confession, went home and walked up to his sister, put his arms about her neck and kissed her. The action was so unusual as both to surprise the sister and to arouse her intelligent suspicions. Goethe makes much use of this type of emotional discharge in his "Elective Affinities," and Tennyson alludes to it in the lines,

Dear as remembered kisses after death,  
And sweet as those by hopeless fancy feigned  
On lips that are for others.

Such manifestations are not far removed from those that are shown to pet animals and to persons of the same sex, reference to which has previously been made.

Previous to the age of about nine the girl is more aggressive than the boy in love affairs. At this age her modesty, coyness and native love for being wooed, come to the surface and thereafter characterize her attitude toward the opposite sex.

#### TYPICAL CASES.

Case 1. A boy of eight confessed through a girl's friends his love for the girl. Then on the playground he did little favors for her as though they were matters of course. If attention was in any way called to his acts of kindness he would lightly dismiss the affair with "Oh, that's nothin'," always showing embarrassment at the fact that his favoritism had been observed. In writing about it the girl says: "I liked him very much and enjoyed being near him on the playground, but was very much embarrassed when he spoke to me; so about all the pleasure that I got out of this little romance was in watching him as he would try to gain my attention and good-will while we were all at play."

Case 2. In a case that continued from seven to thirteen the writer says: "I wanted to stand by him in the game, but would never make the effort to get the situation—although it always came about. He sent me very pretty valentines, but was very careful that I should not find out who sent them. When we met on the street we would both blush, and a strange feeling would possess me that I did not have on any other occasion. My bliss was complete when I was walking down the street and he overtook me—although we could say nothing to each other."

Case 3. B. 9, g. 11. Boy very much annoyed by the fact that the girl was two years older. He thought that the husband ought always to be older, and "looked forward to the time when I should make her my wife. It was in secret, however, and I was always fearful lest some one should find it out. The girl probably never bestowed a thought upon me. I was very shy in her presence, and if she spoke to me or addressed me in any manner my tongue clove to the roof of my mouth, making it almost impossible for me to answer. I dreamed about her night after night, and upon hearing her name mentioned I would become confused and nervous." This continued from nine to fifteen, and developed into a genuine case of adolescent love.

Case 4. B. 11, g. 9. Boy would come to take the girl to their little parties—but would never walk on the same side of the street with her. The girl writes: "We were very much afraid of each other, and

yet we were n't. When we were together we never would speak to each other if we could help it, but when we were apart we wrote notes constantly."

Case 5. "I was very much in love with a boy when I was between seven and nine years of age. I always felt hurt if he chose any one else in the games. I was very much embarrassed if this boy's name was mentioned in the presence of my mother or brothers. I did n't mind their teasing me about any other boy. I felt none of this embarrassment in the presence of my sympathetic playmates."

Case 6. An eight-year-old boy contemplated suicide because his sweetheart moved into another neighborhood. He would not tell her that he loved her. Wanted to give her a present, but feared she would divine the truth.

Case 7. From a woman's confessions, referring to her love at nine years of age: We never used the word *love*, it was always *like*. I think we felt afraid of *love*. I think we had no definite idea of marriage, we lived completely in the present. However, I felt in a dim way that we were always to be together.

Case 8. From a man's confessions: "I never told any one that I loved the girl, and did not even want the girl to know it. I was satisfied to be in sight of the girl. I was nine and she was ten."

Case 9. B. 9, g. 8. A blue-eyed girl and a handsome dark-eyed boy. One day he told Bessie he had something to tell her, but that she must tell no one. He said that he had wanted to tell her before but could not; now he would tell her if he choked to death in the effort. Braving all difficulties, he led Bessie to an oak tree and while pretending to be gathering acorns, told her of his love. She forgot that she should "tell no one," and at the first opportunity told me the whole story, and how she had loved him, but had never imagined he cared anything for her. I had understood Bessie's feelings before she told me this, and now rejoiced with her. She wanted to be with him almost constantly, but he was shy and always wished to conceal his affection from every one except from Bessie. She thought the mutual love something to be very proud of, and could not understand why he could not tell every one unblushingly as she did. She talked of a far-away sometime when she should be his wife; he, terribly embarrassed, acknowledged the fact when she mentioned it in his presence. This condition of affairs continued about three months, when she gradually came to the conclusion that he did not love her and she would give him up for one she knew loved her. This was a young man of seventeen or eighteen who delighted in holding her on his knee, playing with her curls and caressing her in different ways. He cared for her as boys of that age usually care for little girls. Milton, filled with jealous anger, remained at a distance for awhile, and then spoke of the unusual proceedings to Bessie. She told him in child language that "When one is truly in love one not only says it but shows it," and having fallen desperately in love with the more fortunate young man she gave Milton to understand that he need hope no more. The new lover remained but a short time, and after bestowing a beautiful doll as a parting gift he went away. She cried, was sorry that she had misunderstood Milton, but was too proud to call him back, and contented herself with her doll, declaring she did not like boys, and would never, never have a lover again. Milton with his parents soon moved away, and we never saw him again.

Case 10. B. 10, g. 16. A boy of ten very much in love with a girl of sixteen. They wrote letters which they exchanged in some secret way. I chanced to see some of the letters which the boy had received from the girl in which she was profuse in her expressions of love. The girl

did not seem to care if her love for the boy was known, but the boy was shy. This continued for some time, in fact, until the young lady was engaged to be married to a young man, and within a week of her marriage she told her grandmother that if H. were but a little older her eyes would be turned in a different direction.

Case 11. The two children I refer to were about nine years old. They seemed to think a very great deal of each other, but were very shy in the presence of others. He often sent the little girl presents of flowers and candy on the sly. They continued to love each other for three or four years, until they finally became estranged through jealousy.

Case 12. When I was nine years old I fell in love with a girl about my own age who was also in love with me. I was jealous when I saw her playing with any other boy. I never told any one that I loved the girl, and did n't even want her to know it. As I grew older it gradually disappeared without anything to break it up.

Case 13. From the age of seven to ten I loved a boy of my own age. It happened occasionally that the class would stand up to spell, and when it did we frequently stood side-by-side. When the teacher allowed the school to spell in the old-fashioned way of "turning down" we were averse either to go above the other when we were entitled to do so. Our childish happiness lasted but one school term. His family moved away. We both felt the separation very keenly, and were sure that we never would have such friends again. At ten I thought more of another boy who had recently moved to our town. Our love began by our playing together in games with others. Our attachment grew to be very warm. He would send me valentines, and I would usually answer them. We were together in our study and in our games and sports. He would choose me and I would choose him,—except occasionally to tease him I would choose his nephew who was a little older than he. At times he did not appear to care, but at others he became angry. This love continued for four years with occasional interruptions in its placidity.

Cases of early love continuing throughout life. Case 6, page 335, and case 11, page 336, also belong to this group.

Case 1. My father and mother fell in love with each other when they were five years old, and were lovers till they died, both at the age of sixty-seven. When they were children they lived in the country some miles apart. Their parents attended the same church, and on Sundays in the summer-time the children were allowed to play outside while the church services were going on. It was in this way that they met, and for some time they saw each other only on Sundays. When seven years old they started to the same school, and from that time on they were very devoted lovers. They were married at twenty-two, and lived happily together during forty-five years. They raised a large family, all of the members of which are now grown.

Case 2. I know of a couple who have been married ten years who have been lovers since childhood. The husband is four years older than his wife, with whom he fell in love when he was seven years old. They lived in the same town, and their parents were the best of friends. The children had many opportunities for being together, and always seemed very happy in each other's company. They were always acknowledged to be lover and sweetheart by their playmates, and it seemed very natural that they should marry, which they did when she was seventeen.

Case 3. I have a friend who is about five years older than I. We have



been very intimate, and she has told me everything about her life. She and her husband have been lovers since they were five years old. She says that there has never been a time in her life since that time when she did n't love him. They were neighbors when they were small children, but moved apart and did not see each other for years. She went with friends to Europe and had many interesting experiences with other suitors, but her love for that boy never changed except to grow stronger. They have been married several years.

Case 4. During the time that I was teaching I boarded for several terms in a family, the husband and wife of which told me that they had been lovers since the first year that they attended school, and that neither had ever had any other lover.

Case 5. Two young people that I know have been lovers since they were babes. During their early school years the little boy would call for his little sweetheart every morning and take her to school. He was always at her side during the play periods, and would walk home with her after school was out in the afternoon. When either was sick the other called regularly and brought little favors. They have been very jealous of one another during all of their life. They are now twenty and soon will be married.

Case 6. I know a couple who were married at the age of nineteen whose love began when they were children. Their parents were neighbors, and the children grew up together. During their childhood their love was not interfered with by the parents, but when they arrived at adolescence and began to go to parties together the parents of both objected. The most severe measures of the parents of both failed to prevent their marriage.

#### Cases with disparity in the ages of the lovers.

Case 1. A little boy of four began to show the most devoted love for a young lady. Even when she was absent the mention of her name would cause an expression of almost worship to pass over his little face. She gave him her picture, and every night he said his prayers to it and kissed it good-night. There was no cloud in his sky until one day he heard two members of the family discussing the arrival of a young man who was interested in the young lady. No notice was taken of the little one, and when dinner time came he was missing. He was found in the carriage-house—a little bundle of indignation—getting ready to drive down town. In the carriage he had put his father's shot-gun, and he vowed vengeance on the young man who was "stealing away" his "darling," as he called her. It took some time to pacify him, and he was only satisfied when the young lady herself appeared on the scene and promised him she would not marry the young man. That was nearly three years ago, and he is still as devoted a little lover as he was then.

Case 2. A little girl of five showed great affection for a boy of twenty-one. She used to climb upon his lap and caress him, and he never forgot to have some little delicacy for her in his pockets. This little girl had a pet kitten which her parents did not wish her to play with, and so her brothers coaxed the young man to kill it, thinking that she would think anything which he did all right. But the child's conduct towards him changed, and she did n't care for him as before. She is now nineteen years old, but whenever she sees him she thinks:—"He killed my pet."

Case 3. I knew of a little girl not more than four years of age who became warmly attached to a young gentleman. He laughingly said to the child "I will wait for you." She did not forget the remark, but looked upon him as her ideal. Every act of friendship between him

and other lady friends was noticed with a jealous eye by the child. The young man travelled through the West, and while there met a lady who later became his wife. When the child learned this she was very angry and hated the lady. She did not feel differently about it until she was grown.

Case 4. A girl ten years old became very fond of a young man of nineteen while they both were attending school. She would wait for him to walk home with her from school. She took great pride in her personal appearance, and would always wonder if it would please him. This affection lasted through one winter and the next summer. After that the girl seemed to care for the boys of her own age.

Case 5. The last year I taught there were two little boys, Lambert, aged seven, and Frank, aged six, who fell in love with me. Lambert was very demonstrative when alone with me or when only grown folks were around, but did nothing in the presence of his schoolmates. He would put his arms around me, kiss me, and was very happy when he could sit on my lap. He gave me very few presents, but dearly loved to be with me, and often asked me to wait until he grew up so that he could marry me. He very frequently told me how much he loved me, and would ask me if I loved him, and if so whether I loved him more than I did others. Frank was very bashful, and though he would stay near me, would never come very close. He would watch my actions very closely, and tried to please me in every particular. Nearly every day in spring he would bring me a bouquet either of wild or tame flowers. Quite frequently he brought me fruit. If he had only one apple or banana he was never satisfied until I had taken a bite.

Case 6. A boy about ten years old loved a young lady of twenty during two years. Jealousy conspicuous. Expressions of love in the giving of small gifts, such as fruit, flowers, etc. Actions of the boy quite free and gallant in the presence of others. No tendency to withhold demonstrations and be satisfied with love at a distance. On the contrary, he seemed to seize every opportunity to show the lady attention. At about twelve years of age the boy began to hate her as extremely as he had formerly loved her.

Case 7. A little girl three years of age claimed me as her lover. Whenever I called on her parents she rushed to me and wanted me to hug and kiss her, and was never backward in doing her part. If at any time I did not notice her solicitations she would turn away from me and, going to some remote corner of the room, would cry as if her little heart would break. Jealousy was very prominent in her.

Case 8. A little girl three years old and a young man between twenty-five and thirty. It has continued now for about six or eight months and is mutual. The little girl says she is going to marry Mr. —, and he says he wishes he could find a big girl that he thought as much of or that she was a young lady. She is very careful to always be nice in his presence. Will sit on his lap and love him, and seems happier than with any one else. She will ask her mamma "When will Mr. — come to see me?" One day I met him and he told me to tell her that he would be in that afternoon. I did so, and she was very much delighted—ran and told the other members of the household. She seated herself in the parlor and would look at her clothes and brush them and sit in as prim a position as possible. She seemed to want to look her best. Her kindergarten teacher tried to coax her to go to her room; she said, "Oh no, Mr. — is coming to see me," and would ask impatiently when I thought he would come. She acted the same when alone or with others. She was very jealous, and never wanted any other lady to sit nearer him than she was. She would often say "He is mine." She did not object to gentlemen sitting by him. No gifts on either side.

Case 9. Last October a boy of four met for the first time a young lady of eighteen. He at once became strongly attached to her, and during the week they spent visiting the same family he was almost constantly at her side. He would sit on her lap with his arms around her neck, and sometimes shyly kiss her. He would leave his mother and go with the young lady in preference. He wanted to be doing everything that she did. The older boys teased him, but he did not care. Said she was his girl, and always would be. He cried for her to go with him when he went home. He has not seen her since that time, but they have her picture, and he takes it and kisses it and calls her his sweetheart.

Case 10. A little cousin named Blanche when about two years of age became greatly attached to a man who worked for her father and lived with the family. He was probably thirty years her senior. The feeling continued growing stronger for about four years, when it was broken off by her finding out that he "had another girl." She told me once that she loved him more than she did her papa or mamma, and that when she grew up would go and live with him. When she got presents for any of her friends he was always remembered. She was very demonstrative, sitting on his lap and in many other ways showing her feeling for him.

Case 11. A young lady of twenty years and a boy of six. We all boarded in the same house. He was so attached to her that he would never go to sleep without kissing her good-night. The very coldest day in winter if his mamma did n't have his coat and mittens on him when the bell rang for twelve o'clock or for six o'clock he would go without them to meet her, for he knew that she came at that time. He was always asking if she loved him, and if she would wait until he was a man and marry him. This continued for nearly three years when, one day, a lady whose hair was gray called on his mamma. He did n't like her, and after she left said to the young lady "I won't marry you when I am a man for your hair will be gray." After that he never cared particularly for her.

Case 12. I know of one case where a little boy about six years old fell in love with a lady about twenty years old, and always used to call her his girl. He used to go and put his arms around her and kiss her at any time; it did not embarrass him if some one was looking at him. He is about eighteen now, and seems to think a great deal of her yet.

Cases showing the continuity of the emotion through the first three stages of its development.

W., 18. I cannot remember a time before I was fourteen years old when there was not some little boy whom I loved. The first case that I can recall occurred when I was five years old. I know that I was five for I have heard my parents say how old I was when they moved away from that place. After we moved away I never saw him any more. We came to another town and I started to school. I was rather afraid of all the little boys, but some of them I liked very much. I can remember one big boy whom I did n't like. He was always trying to play with me, but I thought that I just hated him. One day he caught me and kissed me. It did n't frighten me, it simply made me very angry. I was so provoked that I cried and slapped him in the face as hard as I could. The little boy that I did like at that time was a red cheeked boy with dark hair and blue eyes. I do not remember any particular incident, but I know that we played together all of the time and thought a great deal of each other. I was then about seven years old. By the next year of school this boy had moved away, but

another little boy came to school whom I liked better. His name was Ray. I can remember him better than I can the others. For a long time I thought that he did n't care for me, and while I thought that I was afraid of him;—that is, when I met him I was so bashful and trembled so, because I was afraid that he would find out how I loved him and would make fun of me. Our teacher believed in having little boys and girls sit together in school so that they would not be bashful. I had always sat alone, but now for some reason or another she put Ray in the seat with me. I could not study or do anything with Ray so close to me. I was almost afraid to look up till one day he told me that he loved me. Then I found out that he had been afraid all of the time that I did n't like him. I was over most of my shyness then. I suppose that my teacher concluded that she had cured me of my bashfulness. I wore short dresses then that just came to my knees. I was good at wearing out my stockings at the knees, but my mother was such an excellent darning that it took the closest scrutiny to find the darned places. One day Ray noticed this darning and asked me if my grandmother did it. I told him that my mamma did it. "I wish that I had some one to darn for me like that," he said. I told him that mamma was teaching me to darn that way. "Well," he said, "when we are married you will know how and can darn mine that nice." That was the first that I had thought of our getting married, and I can remember how proud I was to think that he cared so much for me. He was always very good to me, and we never quarrelled. Our love continued about two years. He moved to the city when I was ten years old. He was about a year and a half older. I have seen him only twice since then. The summer that I was eleven years old I met a little boy who was visiting his aunt, our neighbor. He was a year older than I. I cannot remember his name, but can remember how he looked. I loved him the same as I did Ray, except at the time I thought I loved him much better. I did n't know whether he loved me or not, but I thought that he did, because I noticed that he was just as nervous when we were together as I was, and turned his eyes away when I looked at him just as I could n't help doing when he looked at me. One day I told Grace, his cousin, that I liked him better than I did any one else I knew. I said that I believed that I liked him better than I did my mamma. He had been at his aunt's two months, and I told Grace this just the day before he was going away. On the next day he came over in the forenoon and found me standing alone by the rain-barrel, thinking about him and almost crying because he was going away so soon. We stood and talked awhile, and then he said "Say, did you really mean what you said to Grace yesterday?" I can remember just how he looked at me when he said it. I wanted to tell him that I did. Then I thought that I would tease him. So I pretended that I did not know what he meant and tried to get him to tell me what it was. He kept telling me that I knew what it was and to please answer him. But I kept pretending that I did not know. I remember that I thought that I had better not say that I did because he had n't yet said that he loved me. At last he said, "Please do tell me, I would be so happy if I knew that you meant it." I was just going to tell him that I did mean it when mamma called me to come in and help her, so I had to go without telling him. He went away that afternoon, and I have never heard of him since. I cried that night because I had not told him what he wanted me to instead of teasing him. The last boy that I fell in love with had twinkling blue eyes, dark hair and dozens and dozens of freckles. He was what the people call a "holy terror," but every one liked him because he was so free-hearted and ready to help everybody. I do not know how I happened to fall in love with him

nor when, but I did, anyway. He was a favorite with the girls, and that is what spoiled him. He got into the company of bad girls and boys, and before he was fifteen years old he was the worst boy in town. He is now about twenty-one or twenty-two, and no respectable girl will have anything to do with him. I prayed and prayed that he might be changed, but it seemed that it was not to be. I was only a child then, but I loved as earnestly as any woman ever did. After a while my feelings changed. For a time I hated and loved him by turns. Then I began to feel sorry that he could not be good, and so finally I only felt pity for him.

M., 34. I remember that when I was three years old I was very much in love with a young lady of eighteen, the grocer's daughter, who was one of our neighbors. She was especially fond of me, and came for me nearly every day to spend a part and sometimes the whole of the day with her. My sister was married in the month before I was three, and I remember many of the incidents of the wedding. That event marked the first that I can remember about my love for Miss Carter. This love lasted during three years,—until I started to school. Then I soon fell in love with another young lady,—a very beautiful and popular French girl of eighteen. I asked my teacher if I might sit by her. He told me that I might if she were willing. I at once asked her, and she made me very happy by giving her consent. I was her seatmate during all of the remainder of that school year. I was very jealous about the attentions which she received from her many admirers, and was thoroughly miserable during the days that she was absent from school. There was another young lady in the same school whom I loved at the same time, but not with the intensity of my love for my seatmate. In my seventh year I fell in love with a little girl about my own age. I loved her very much, and she loved me in return. We were free and natural in our demonstrations of kissing, embracing and exchanging gifts and attentions. In the case of the two young ladies who were free and even excessive in fondling me, I was relatively passive, but enjoyed all their expressions of love very much. During the years from eight to twelve I was very desperately in love with a girl three years older than I, but about the same size. She was a very beautiful girl with expressive brown eyes and dark but clear complexion. She liked me very much, and it was understood among our playmates that we were lovers, although we were more reserved toward each other than we were toward any of the other school children. I do not know how my secret was discovered, because I had not told any one. I wouldn't have told her for anything. I could n't have. It was very embarrassing for me to speak to her, although in Blackman I always tried to catch her, and usually succeeded for she did n't try very hard to get away. In playing "I Spy," if I was "it," I always allowed her to get to the home goal without spying her. In other games, such as "Dropping the Handkerchief" or choosing games she was the one whom I favored. Any little courtesy that I could show her filled me with keen delight, although I never wanted her to take any notice of it. I wanted her to understand it but not to mention it. The secret understanding between us was not the embarrassing thing,—it was any expression of our love toward each other that we could not stand; any reference to it by others was also very embarrassing. I do not think either of us was teased much. I could not easily keep my eyes off of her during school sessions, and in the recitations, if I chanced to sit or stand by her, I was very nervous and could feel my heart beating with great violence. I never corrected her in class, and have purposely missed many a word in spelling to keep from turning her down. I never wrote her a note nor in any way confessed my love for her except in such acts as

those which I have enumerated. She moved away from our town when I was twelve. I grieved over it for a year or more,—until I fell in love with another girl. This was my first adolescent love, and came over me with great power. The girl was about my own age and loved me as much as I did her. During the first year of this love we were both somewhat shy. We wrote notes and made the most extravagant confessions on paper, but would carefully avoid such in our conversations. In the choosing games we nearly always chose each other. In the kissing games I was the only boy whom she would kiss. There was one other boy whom she would allow to kiss her. I was very jealous of him although he was my chum. At fourteen we had passed our shy stage, and then became very demonstrative and sought each other's company outside of school. We exchanged love-letters very frequently. Some of these were twenty to thirty pages long, and were more poetic and beautiful than anything that I have been able to write since. I have some of them yet, and read them with much pleasure. My love for this girl lasted through more than three years, during which I was never absent from her home on Sunday. Our relations were encouraged by her parents. We had the usual love quarrels and temporary estrangements on account of jealousy, but they were soon over. At seventeen I left that town to teach school in another town fifteen miles away. She was attending school in the academy. While I was away two of my rivals perfected a plot that effected our estrangement. For a year we did not speak to each other. Then there was a sort of reconciliation, but nothing could undo the harm that had been done. I have not seen her for thirteen years, but I still think of her very kindly and recall our youthful romance as a pleasant and sacred memory.

W., 31. When I was about three years old a little boy of two lived near us. Our parents were warm friends and encouraged the love affair that soon sprang up between us. Our love was open and quite as a matter of course, we were very demonstrative and not in the least embarrassed by observers until I was about six, when we became more shy. We played house, and were always man and wife. Scarcely a day passed which we did not spend playing together from morning until night. Neither of us cared anything about playing with others. Once I remember as I was going home from the store carrying a little basket, Walter's cousin, a boy of about the same age, offered to carry it for me. He had no sooner taken it than Walter overtook us and commanded him to give him the basket saying that he *always* took care of me. When the young gallant refused to give up the basket Walter took it from him and, putting it at a safe distance, proceeded to give him a pounding. Then he took up the basket and walked home with me. I remember that I enjoyed this scene very thoroughly. We were almost inseparable for five years, when my family moved out West. We exchanged gifts and promises of eternal love, but the parting was very sad. We promised to wait for each other and marry some day. Within the next two years he sent me gifts and I sent him gifts and letters. His mother said he enjoyed getting the letters but was too shy to answer them, and was very easily teased about me. I was very proud of my lover, and told my new little friends about him. I was very happy when he sent me a photograph of himself neatly framed when he was about nine years old. Although we still considered ourselves sweethearts we were each enjoying love affairs at home. During my ninth year I had a lover about my own age. He was very popular among all the girls because of the gifts he distributed liberally. I was decidedly his favorite, and was proud of the distinction. We were shy before grown people, but at school were acknowledged lovers. While not openly demonstrative, we took advantage of our



games to show our love by choosing each other and giving the kiss or other mark of affection required by the game. We especially enjoyed walking home from school together or playing together when no one else was by. My heart was almost broken when it was discovered that he had been stealing small sums of money for some time in order to give me the gifts which had made me so happy. I was not allowed to have anything more to do with him, and he soon moved away. About this time I fell in love with a young man twice as old as I. He worked in my father's office and boarded with us. I loved to be with him, and was especially happy when he took me with him to church or some entertainment. When he would take me by the arm and help me through the deep snow I felt very grown up and proud of his attention. He cared for me as a little girl and I worshipped him as my knight. I was very jealous when he showed any young lady attention. Soon after this my father died and we moved to a lonely station on the prairie. Again I fell in love with a man more than twice my age whom I saw very seldom. I was very happy when he took me on his lap or caressed me. I was very shy both with him and about him, but magnified every look and word and act until I convinced myself that he loved me as much as I did him. I was intensely jealous, and when I did waken to the fact that he loved a young lady I was nearly heart broken. No one dreamed of this except a girl confidant. His marriage several years after hurt me. I think he never suspected my feelings. When about thirteen a boy a little older than I moved into our town from the East, and we proceeded to fall in love with each other at once. We wrote long letters to each other daily,—although we sat across the aisle from each other—and handed them to each other slyly when we thought no one was looking. When I was obliged to remain at home one week he brought me a long letter each evening after school. These letters were full of love and jealousy, and were read over and over, and were often carried next the heart. We took long walks and rides together, but I cannot recall a single caress given or received during the two years we were acknowledged lovers. I had received very strict teaching in regard to such things. Both of us were easily teased and very bashful when observed by others. When he was sent to a town fifteen miles away he felt sure I would forget him and that this meant the end of our beautiful love. I grieved over his leaving and because we were not allowed to correspond, but was really beginning to love a young man somewhat older so much that I was not inconsolable. We were very jealous of each other, and the news which came to each did not contribute to our peace of mind until we gradually grew apart. This affair was renewed later, and was of quite a different character.



## FIXED VISUALIZATION: THREE NEW FORMS.

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In making a record of the following case, which was first reported at the New Haven meeting of the American Psychological Association, the language used by the subject in verbal description is selected from the stenographic records. The language aids the reader to appreciate the manner in which the forms are experienced and apperceived by the subject. The case is of interest on account of the variety of forms, their permanency and certain uniformities characterizing them.<sup>1</sup> The diagrams, I to VI, in the chart on page 356, representing selected features of the forms for numbers, days, and months, will give fixity to the descriptions. The diagrams are reproductions of the "geography" of the various units in each form as they were located on a large scale by the subject. Diagram I shows the number form, diagram II, the month form, and diagram III, the day form in the horizontal plane. All the numbers from one to one hundred appear in their serial places, as indicated in I. The relative locations of the three forms, as experienced by the subject, can be ascertained by mentally superimposing the point of regard in II-III upon the point of regard in I. Although the day and month forms are never visualized simultaneously, diagrams II and III have been sketched with the same point of regard, so as readily to indicate their points of contrast and agreement.

Selected details of the number form are sketched in diagrams IV-VI. IV is a vertical section, showing the elevation of the respective numbers indicated, AB being the horizontal plane of vision. V is designed to represent the elevation in the series from one to twenty-nine. The remaining groups of tens repeat the variations in elevation thrice indicated in V, but at a greater inclination, are represented in VI. I may add that the original sketches were repeatedly verified by the subject. (In VI, the inclines of all groups from thirty to ninety should be parallel. It has been impossible to secure the geometrical accuracy in the case of seventy, eighty, and ninety in VI and IV, which tends to be a feature in the other localizations.)

<sup>1</sup> Descriptions of additional forms are to be found in this *Journal*, Vol. V, 1892-1893, pp. 265 ff., 439 ff.; Vol. VIII, 1896-1897, pp. 506 ff.



## I. THE NUMBER FORM.

The number-form appears to the subject in a half fan-like radiation, extending forward and to the left of the mental point of regard. This composite feature appeared gradually from the following description: "I look down to one, which is very near me and slightly to the right. Two is farther away and above one. Three is lower than two, but not so low as one. Four is sharply above three. Five is higher than four, and beyond four. Six goes down below five. Seven is more below six than six is below five; in fact, seven seems lower than one though it is beyond one. Eight rises sharply from seven, more sharply than four is from three. In regard to nine, it is difficult to tell whether it is above or below eight. I think it is very slightly below eight, being on the incline. Ten is above nine, and is directly opposite the mental point of regard, in the horizontal plane. Eleven is a little below ten. Twelve is above eleven. Thirteen is a little below twelve. Fourteen is above thirteen. Fifteen is above fourteen, being quite high, so that I have to look up to it. Sixteen is below fourteen. I never think of sixteen being on a level with thirteen, but think of a number only in relation to the one preceding and the one following it. Seventeen is below sixteen. Seven is the lowest number in the first series of ten. This is true of all the tens. The series of seventy is the lowest in the whole series, seventy-seven being the lowest of all the numbers. Eighteen rises sharply above seventeen. Nineteen is to eighteen as nine is to eight, but beyond it. I think of it as lower, but know it is higher on account of the incline. Twenty rises above nineteen. Twenty-one is a little lower. The varying positions of the numbers from twenty-one to twenty-nine repeat the variations in the series from one to ten."

"The numbers fall into groups as follows. One to twenty-nine are in a continuous direction. Twenty-nine seems about twelve feet distant from me. The next group includes thirty to thirty-nine, and lies to the left of the twenties. Thirty is about as near me as twenty-seven. The numbers in this group seem to bank themselves together in an incline that is steeper than the incline occupied by one to twenty-nine. The next group includes forty to forty-nine, and lies to the left of the thirties. These numbers are arranged in a manner similar to those in the thirty group. The remaining groups include the fifties, the sixties, the seventies, the eighties, and the nineties, one hundred being beyond ninety-nine, each group being arranged similar to the thirties."

"The numbers in the twenty series stand out as distinctly as the first few numbers. I do not think of their size, but only

of their locations. I see these numbers as we ordinarily write them, that is, the numbers up to twenty. Though I can put in a figure, I usually think of the word 'seven.' The word 'one' is very short in comparison with the word 'sixteen.' From twenty to twenty-nine the numbers seem to appear; in the thirty group the words."

"The series one to twenty-nine seems darker than the surrounding space. The words are not illuminated. The word itself is darker. The space around it seems gray. There is no difference in the shading from one to one hundred. There is no illumination; all seems dark. In the side series I see nothing at all; that region does not appear except when I try to picture it." (Later analytical experience with the form revealed that the whole form could be made to stand out at once.)

"I never find, for example, a number from one to twenty-nine missing; it always appears. The space comes instantly. When any one says 'twenty-nine dollars,' my mind goes immediately to the twenty-nine in that space. I cannot transpose the numbers, and a number never seems out of place. I cannot put seven where sixteen is, nor move forty to where thirty is. I seem to have no control over the arrangement of the whole series, nor over any number in the series. If I try to look down the right side of the thirties or the forties, my mind does not seem able to view them in that relation at all."

"I put thirty a little higher than thirty-one, and forty a little higher than forty-one, and so on throughout the remaining groups. Thirty is the lowest one in that incline; it occupies the lowest plane. Thirty-one is seen lower than thirty, dropping a little, but *is* higher, being on the incline. Thirty is about on a level with twenty-nine. I never think of looking past thirty-nine to forty. Forty never gets in the way of thirty-nine, the latter being a little lower than the former."

"Forty is higher than any in the twenty series. The numbers from forty-one to forty-nine are just the same in their relations to each other as the numbers in the thirty series. Forty-nine is just as much higher than thirty-nine as forty is higher than thirty, both series having the same inclination. The fifty series is higher than the forty, the same as five is higher than four. The sixty series is below the fifty quite decidedly; I think it is below the forty. I cannot compare the elevations of thirty and sixty. I think I can look at the fifties and the sixties from either side. If I were not thinking about it, I might be able to tell better. Seventy is to sixty just about as seven is to six, being lower. The seventies are much lower than seven, the lowest point in the entire form being seventy-seven. Fifty-five is the highest number. Eighty is a little

higher than seventy, and ninety is a little higher than eighty. I look upon one to twenty-nine, the thirties, and the forties from the left side, and on the nineties, eighties, and seventies from the right side of the series. The fifties and sixties seem to be almost directly in the line of vision."

"The numbers seem to occupy spaces, which I would represent by a parallelogram, measuring about  $\frac{5}{8}$ ths by  $\frac{1}{8}$ th inches for the larger numbers, and  $\frac{3}{8}$ ths by  $\frac{1}{8}$ th for the smaller numbers."

A time-test revealed that the successive numbers "rose" in the mind very rapidly. Viewing each number successively from one to one hundred, omitting none, required an average interval of only twenty-eight seconds. A similar test on a number of adults without any number form required intervals varying from seventy-three to ninety-two seconds. The subject required thirty-two seconds to count the whole series, that is, mentally saying the words while following the numbers. This proved to be the approximate average for the other adults.

"Whenever I perceive a number written on the blackboard, I see it in this series if it is below one hundred. I never confuse the numbers on the board with the numbers in my mind. I cannot read a newspaper account containing numbers less than one hundred so rapidly as not to see the numbers in the form. If, on the other hand, I wanted to remember a special thing, such as in shopping, if I wished to buy two spools of silk and five yards of ribbon, I would not use these mental numbers in any way. They would not help me to remember. Whenever a mistake is made in change, for example, the series never helps me out. Once I could remember numbers in general statistics quite well, but not now. I was always very quick and accurate in arithmetic, and learned it very fast."

"I have not noticed any tendency on the part of the form to change during the last few years. In fact, it is permanent, and could not change. In thinking of thirty, or forty, I would not feel uncomfortable if all the other numbers were missing. These are in their places, and the others will come up if needed. The series has never in any way bothered me by standing out in its entirety, or by any inability to get rid of the numbers. It never interferes with my attention. It has never been any source of wonder to me, always seeming perfectly natural. I have a faint impression of thinking about it, or being conscious of it four years ago. I may have come across something like it in my reading. I have never attempted to analyze it in any way. The last few days have tended to make the plan clearer, and I have learned many things about it (the subject being a member of a class in psychology). Should a number less than one hundred fail to appear in its place when I am thinking of

it, I should feel much surprised. It is perfectly agreeable to me to have this form."

"I can always see it better with my eyes shut. If I try to picture it and cannot get the relations right, I close my eyes and then I can get the detail very readily. I dream a great deal, but I do not remember that the form has ever appeared in my dreams. I also find it impossible to construct any image and place it between the numbers and myself. I do not have much trouble in getting images of things, except that when reading descriptions of places in books, I cannot see the places."

Within four months after the above descriptions were given, the subject discovered that it was possible to enlarge and to contract the form at will. In either instance of change, the proportions of the geometrical relations did not vary. No dream experience in the interval which involved the form was reported.

## II. THE DAY FORM.

In addition to the form for numbers, this subject has a tri-dimensional form into which the days of the week are placed. This is a relatively simple form, lies near in front and extends to the left. The time direction is from right to left. It starts with Sunday, which is always the first day of the form (see diagram III), close to the mental point of regard. This day is to the right, and nearly on a level with the eye, but must be looked up to slightly. Monday is to the left of the direct line of vision, "quite a space above, and a little higher than Sunday." Monday is the highest day of the week. Tuesday is about as far beyond Monday as the latter is distant from Sunday, but "goes below Sunday." Wednesday descends slightly, while Thursday ascends "a little bit higher than Wednesday." Friday "is very low down, being the lowest day." Friday evening is the lowest part of the week. "A straight line connecting the evening and morning of Friday, if continued, would pass through the point of regard." Saturday "rises from Friday up towards the *next* Sunday," which is not quite so high as the first Sunday.

This form is always of "the present week." It can be repeated for one or two weeks in the future, when it is projected farther to the left, until it becomes dim and fades away. One or two weeks just past can be arranged, or "thought of," in the same form, when they are added on towards the right of the Sunday with which the series begins. The past days begin to fade away at the end of one or two weeks. The present week is the staple and recurrent form.

The names of the days of the week appear in print, as it were, filling spaces lying at right angles to the time-line, which



marks the general forward direction from right to left. These names appear as "dark spaces," with but little illumination, and no coloring. As in the case of numbers, they seem to be parallelograms of uniform dimensions. The days seem to be distinct from the nights, the latter being represented by the darker spaces between the former, which are equal throughout the form. The forenoon of a day is usually "seen" as either the nearer portion of the *time*-line occupied by that day, or by the portion of the *day*-line below the *time*-line. The afternoon is "seen" as either the portion of the *time*-line to the left of the *day*-line, or the upper half of the *day*-line itself. The subject has no preferences among the days.

An interesting fact connected with this form is, that, while the names of the days were known ("learned") before the subject could read, it never occurred to the person that use was being made of this form until the Sunday before the statement of these descriptions, in August, 1899. On that day the report ran thus: "I wondered how I would look on Wednesday (that is, how Wednesday would appear); but I had to wait until Wednesday actually came." It became a new experience to get the days "all together," and to connect the facts. This implies that the visualization had a definite dependence upon the actual perception of time as filled in with the associative aid of the name given to a particular portion of time.

### III. THE MONTH FORM.

The months comprising the current calendar year are arranged by the subject into a form, which is distinct from the form for the days. In relation to the latter, the month form is "located" farther away from the mental point of regard, and in a position more nearly at right angles to the line of vision (see diagrams II and III). This form also is tri-dimensional. "The months seem to rise to the left. January is farther away than the days of the week, and a little below the horizontal plane passing through the point of regard. February is higher, and March is still higher, April descends, while May is the highest month in the entire year. June, July, and August are each a little lower than its predecessor. September, October, and November ascend, in each instance, slightly above its predecessor, while December goes down toward the next January. At New Year's the form starts anew." The spaces between the months seem equal. "August, the present month, is seen permanently to the left."

The name of each month does not seem to lie at right angles to the *time*-line. The time direction, as in the day form, is towards the left. "The first few letters of the name of the month seem to cover the first few days of the month, but

tending towards the right, the remaining letters swing off towards the right of the time direction, while time moves to the left." In the case of the longer names, it is usually the ordinary abbreviation of each name which appears, such as "Jan.," "Sept." The shorter names appear in full.

This form is always of "the present year." The months of the past year can be localized by special effort. "A year ago this month is localized by stepping back from the January of the form to December, November, and so on, to August, towards the right. This process can be continued for about a year previous to the first January, when fading takes place." The next year can be constructed in a similar manner, *mutatis mutandis*, by beginning with December and proceeding to the right.

The subject has preferences for some of the months and aversions towards others. May seems especially agreeable, while December is not liked in the least (that is, the months in the form). There is "always a feeling of relief when December has passed." These associations are regarded by the subject as due probably to later experiences, derived from reading and observation.

It should be noted that the direction of time in the day and month forms moves from right to left, conforming to the general group direction assumed by the number form, instead of from left to right, the usual way of placing successive days and months in an occidental calendar, for example.

#### IV. CHARACTERISTICS OF THE SUBJECT.

The following biographical data are added for such light as might be thrown upon the genesis of these three forms of visualization. The subject possessing these forms is an unmarried woman, thirty-five years of age at the time of the first descriptions. She was born in Hamilton, Ontario, being the seventh child in order of birth in a family of twelve children, whose parents were natives of Ireland. Four children died in infancy. The father had been a school teacher before immigrating to America. Her home was in a country district until her ninth year. Her playmates were her brothers and sisters and a few children from the neighboring farms. As a child she "was always shy and timid, committing many childish misdeeds, and always afraid of punishment." No early experience of fright or strain in early years stands out distinctly in memory. She was delicate in health until the age of ten, but does not recall any special illness at any time; there was no marked trouble with her eyes in childhood. Since her fourteenth year her right eye has been astigmatic, and the left eye myopic, both defects having been corrected by wearing proper glasses during the last few years.

The subject first attended school about three months before the ninth year of age. "I was noted in those times for having a good memory. They never said anything about the meaning of words, and I had great trouble in learning words at school; but I could always get my arithmetic lessons." She liked number work, especially when a child, "better than anything else," because she had the satisfaction of having this work right in contrast with language exercises. She learned to read very rapidly, covering the first, second, and third readers in one year. Writing was first taught her in the ninth year, but she was able to make figures long before she could write, or read writing.

The number series is remembered distinctly as fully formed at the age of eight years. The multiplication tables were learned at that time, but the ability to count was acquired at a very much earlier age. The older children of the family were taught at home, and she recalls overhearing her brothers at their work. Thus she became able to count to one hundred before the eighth year. There is no memory of being taught to count (except the drill work in class, where the exercise consisted merely of the repetition of the names of the numbers), but there is a memory of having learned to count before the sixth year. The acquisition of the multiplication table is distinctly remembered. The table was printed, as usual then, in full in the text-book. At that time the numbers, when thought of, were placed in the proper spaces in the number series. In multiplying two by two, four was always thought of as now, the thought being of the product and not of the factors. The subject has experienced no particular liking or disliking for special numbers, except three, which was once made with a distinct pleasure. The formation of the figure 3 was very difficult until the age of fourteen, when the ability to make the figure was acquired by diligent and assiduous practice.

The names of the days of the week were learned *previous* to learning to read. The names of the months were first known *after* having learned to read. The scheme for the months is remembered as having been acquired later than the scheme for the days. (This fact does not essentially discredit the report above, that the form for the days was not fully thought over until the time of special description.) In motor abilities, there is no disposition on the part of the subject to be left-handed. This fact may have some negative significance with reference to the feature of all the forms to proceed to the left. It was also ascertained that two of her senior brothers possessed number forms. No details of the elder's form were known; the younger's number form was known merely as being much more complex than the one possessed by the subject.

## THE GAMBLING IMPULSE.

By CLEMENS J. FRANCE.

The present study is an attempt to investigate the origin and nature of the instincts and motives involved in chance plays and gambling. The writer has followed the biological or genetic method approach, calling upon the facts of biology, anthropology and history as aids in the solution of the problems encountered. The historical side has been especially emphasized as the writer has had in mind the ethical and sociological value of a contribution to the subject of gambling, as well as the psychological. From this point of view the historical aspects appealed to the writer as being of especial significance.

The writer takes great pleasure in expressing his thanks to President G. Stanley Hall who has been throughout the investigation a constant source of inspiration as well as of assistance. He also wishes to acknowledge the aid of Professor E. C. Sanford in giving much valuable criticism both as regards the form and content of the work, of Dr. Alexander Chamberlain in suggesting literature, and of Mr. L. N. Wilson, the Librarian of Clark University, in procuring a number of rare and valuable books.

*Section I. Historical.* Gambling seems to be indigenous among all races. There is evidence of its antiquity both in Egyptian paintings and in materials of undoubted genuineness found in the tombs of this same people; among whom the practice was even attributed to the gods.<sup>1</sup> Evidence of the extent and danger of the habit is given from the fact that a man convicted of gambling in Egypt was condemned to work in the quarries.<sup>2</sup> Certain gambling games of the Chinese and Japanese are said to have been invented by the Emperor Yao, 2100 B. C.<sup>3</sup> Gambling among the ancient Hindus, Wheeler tells us, became a madness. There are certain Hindu legends of Rajahs, playing for days in succession, until the loser is reduced to the condition of an exile or a slave.<sup>4</sup> Among the ancient Persians

<sup>1</sup> Ashton: History of Gambling in England, p. 3.

<sup>2</sup> Steinmetz: Gaming Table, Vol. I, p. 57.

<sup>3</sup> Ashton: *ibid.*, p. 4.

<sup>4</sup> J. Talboys Wheeler: The History of India from the Earliest Days, Vol. I, pp. 175-185. London, 1868.

gambling was a common diversion. Plutarch in his life of Artaxerxes relates that Queen Parysates, the mother of the younger Cyrus, at one time "used all her skill in gambling to satiate her revenge and accomplish her bloodthirsty projects against the murderers of her favorite son."<sup>1</sup> The prohibitions in the Koran are unable to suppress the practice among the modern Persians.<sup>2</sup> History furnishes examples of people risking their lives on a single throw of the dice. St. Ambrose informs us that this was common with the ancient peoples, especially the Scythians. He also tells of how the Huns were ready to play at all times, even when at war; that they always carried their dice with them, guarding them as they would their arms.<sup>3</sup> There is not much evidence that the ancient Jews ever gambled, except by drawing lots.

This practice was very common, and we know that the "promised land" was thus divided. Disney tells us that, in later days, the Jews did gamble and that gamblers were excluded from the magistracy, and were incapable of being chosen into the greater or lesser Sanhedrin; and that they could not be admitted as witnesses.<sup>4</sup>

"In China," says Huc, "gaming is prohibited and yet is carried on everywhere with almost unequalled passion. . . . China is, in fact, one vast gaming house. . . . The games are very numerous. They play day and night, till they have lost all they have, and then they usually hang themselves."<sup>5</sup> Williams says "Gambling in China is universal. Hucksters at the roadside are provided with cup and saucer, and the clicking of dice is heard at every corner. A boy with but two cash prefers to risk their loss on the throw of a die, to simply buying a cake without trying the chance of getting it for nothing. Gambling houses are kept open by scores by paying bribes to the officers."<sup>6</sup>

In ancient Greece, also, gambling prevailed to a large extent. Philip of Macedon favored the practice, recognizing its corrupting influence on the Greeks. Aristotle ranked gamblers with thieves and plunderers (*Ethic ad Nicomachum*, lib. IV), and the Athenian orator, Callistratus, speaks of the desperate

<sup>1</sup> Steinmetz: *ibid.*, Vol. I, p. 57.

<sup>2</sup> Steinmetz: *ibid.*, Vol. I, p. 59.

<sup>3</sup> Jean Barbeyrac: *Traite du Jeu*, 3 vols. Amsterdam, 1737. Tom. II, p. 345.

<sup>4</sup> John Disney: *A View of Ancient Laws Against Sin, Morality and Profaneness*. Camb, 1729. Quoted from Ashton: *ibid.*, p. 5.

<sup>5</sup> Huc: *Chinese Empire*. Quoted from *Rouge et Noir*, Gambling World, p. 35-36.

<sup>6</sup> S. Wills Williams: *The Middle Kingdom*. New York, 1900. Vol. I, p. 825.

gambling in vogue. (Xenophon Hist. of Greece, lib. VI, C. 111).<sup>1</sup>

Evidence of extensive gambling at Rome is derived from the excavations of Pompeii and other places. "Sig. Rodolfo Lanciani says that, so intense was the love of the Roman for games of hazard that whenever he had excavated the pavement of a portico, basilica, bath or any flat surface, accessible to the public, he always found gaming tables engraved or scratched on the marble or stone slabs."<sup>2</sup> Ashton writes: "Notwithstanding the laws against it, there was hardly in Rome a more common or more ruinous pastime."<sup>3</sup>

Steinmetz devotes a chapter to the gambling amongst ancient Roman emperors.<sup>4</sup> Augustus was passionately addicted to the practice, and even gloried in his character of a gamester. Caligula stooped even to falsehood and perjury at the gaming table. "The Emperor Claudius played like an imbecile and Nero like a madman." Nero would stake 400,000 sesterii (£20,000) on a single throw of the dice, and Claudius had the interior of his carriage arranged so that he could gamble on his journeys. Domitian was also an inveterate gambler. Juvenal, the contemporary of this emperor, writes: "When was the madness of games of chance more furious? Now-a-days not content with carrying his purse to the gaming table, the gamester conveys his iron chest to the playroom. It is there you witness the most terrible contests. Is it not madness to lose one hundred thousand sesterii and refuse a garment to a slave perishing with cold?"<sup>5</sup> The rage at Rome seems to have kept on increasing until "finally at the epoch when Constantine abandoned Rome never to return, every inhabitant of that city, down to the populace, was addicted to gambling."<sup>6</sup>

That the ancient Germans were devoted to this form of play Tacitus testifies. They would not only stake all their wealth, but also their liberty.<sup>7</sup> In modern times, it was in Germany where there existed the most celebrated gambling resorts of all Europe—Baden-Baden, Ems, Hombourg, Aix-la-chapelle, Wiesbaden. It was to these resorts that the wealth and nobility assembled during the 'cure-season.' "Princes and their subjects, fathers and sons, and even, horrible to say, mothers and daughters, would hang side by side, for half the night,

<sup>1</sup> Steinmetz: *ibid.*, Vol. I, pp. 59-61.

<sup>2</sup> Ashton: *ibid.*, p. 7.

<sup>3</sup> Ashton: *ibid.*, p. 11-12.

<sup>4</sup> *Ibid.*, Vol. I, Ch. IV.

<sup>5</sup> Satire I, 87. Cf. Steinmetz, Vol. I, p. 67.

<sup>6</sup> Steinmetz: *ibid.*, I, p. 68.

<sup>7</sup> De Moribus German, Cap. XX, 14. Quoted from Jean Barbeyrac Traité du Jeu. Tom. II, p. 342-3.



with trembling hands and anxious eyes watching their chance card." <sup>1</sup>

The early French annals record that the 'haughty and idle lords were desperate gamblers,' and that the exercise of this impulse formed their chief occupation. In the reign of Charles VI, who himself gambled heavily, we read of the Hôtel de Nesle—famous for its terrible gaming catastrophies. 'Gambling went on in camp, and even in the presence of the enemy. Generals after having lost their own fortunes compromised the safety of their country.' Play among the lower classes was not excessive at this time;<sup>2</sup> but under Henry IV, every one seemed to catch the frenzy, all professions and trades being carried away by it. Magistrates sold for a price the permission to gamble. An Italian, a professional gambler, Pimentello, made 100,000 pounds in the course of a year; and there was scarcely a day but some one was ruined. The result of this state of things, says Steinmetz, was incalculable social affliction. All this gambling took place in the face of the most stringent laws against it.<sup>3</sup> In the reign of Louis XIII the passion was pretty well suppressed, but in that of Louis XIV the practice prevailed in high circles, and as the king and queen regent both played, every one who had an expectation at court learned to play cards. Steinmetz says: 'Before this, there was something done for the improving of conversation; every one was ambitious to qualify himself for it by reading. But on the introducing of gaming men likewise left off tennis, billiards and other games of skill, and consequently became weaker and more sickly, more ignorant, less polished, more dissipated. . . The women, who till then had commanded respect, accustomed men to treat them with familiarity by spending the whole night with them at play. . . . At the death of Louis XIV three-fourths of the nation thought of nothing but gambling.'<sup>4</sup> Dusaulx writes: "I have found cards and dice in many places where people were in want of bread. I have seen merchants and artisans staking gold by the hands full. A small farmer has just gambled away his harvest, valued at 3,000 francs."<sup>5</sup> In the reign of Louis XVI the passion prevailed unabated, and was undoubtedly increased by the French revolution. At this time gambling was a source of not a little revenue to the government.

The English have always been notable for their propensity to

<sup>1</sup> Steinmetz: Vol. I, p. 157.

<sup>2</sup> Steinmetz: *ibid.*, Vol. I, p. 70.

<sup>3</sup> Steinmetz: *ibid.*, Vol. I, pp. 78 ff.

<sup>4</sup> Steinmetz: *ibid.*, Vol. I, pp. 87-88.

<sup>5</sup> Dusaulx: *De la Passion du Jeu*, 1779. Quoted from Steinmetz, Vol. I, p. 105.

gamble; a writer familiar with the visitors at Monte Carlo says that the majority are English.<sup>1</sup> Hence we are not surprised to find that the use of dice in England is of great antiquity, dating from the advent of the Saxons, Danes, and Romans.<sup>2</sup> Ordericus Vitalis (1075-1143) tells us "that clergymen and bishops are fond of dice playing," and John, of Salisbury (1110-1182) calls it the damnable art. An edict of 1190 shows that gambling was common among the lower classes; also in the 13th and 14th centuries we have evidence of its prevalence.<sup>3</sup> Cotton in his "*Complete Gamester*" gives a vivid description of the practice in the time of Elizabeth. And Lucas in his "*Lives of Notorious Gamblers*," gives proof that high play was common in the reigns of Charles II, James II, William III and Queen Anne.<sup>4</sup> Legislation against card playing was made in the reign of Henry VIII, prohibiting the common people from playing except at Christmas.<sup>5</sup> A book entitled "*The Nicker Nicked, or the Cheats of Gaming Discovered*" (1619), furnishes a good account of the gambling house of that period. The author says: "Most gamesters begin at small game; and, by degrees, if their money or estates hold out, they rise to great sums; some have played first of all their money, then their rings, coach and horses, even their wearing clothes and perukes; and then such a farm; and, at last, perhaps, a lordship."<sup>6</sup>

In the reign of Queen Anne the evil seems to have increased, especially among the women. Ward in a Satire, "*Adam and Eve Stript of their Furbelows*" (1705), has an article on the gambling lady of that period—entitled—"Bad Luck to Him who has Her; or the Gaming Lady." Steele devoted No. 120 of the "*Guardian*" (July 29, 1713,) to female gambling, in which he points out the ruinous effects attendant on the indulgence of it amongst ladies. "Nothing," he says, "so quickly wears out a fine face as the Vigils and cutting Passions of the card table. Hollow eyes, haggard looks, and pale complexions, these are the natural indications of a female gamester." He speaks of the danger to the moral nature and purity of a woman who has lost heavily. "She has then only her person to dispose of." Pope, also, in his *Rape of the Lock* (Canto III) gives a picture of the gambling lady and of the corrupting in-

<sup>1</sup> Rouge et Noir: Gambling World, p. 259.

<sup>2</sup>Ashton: *ibid.*, p. 12.

<sup>3</sup>Ashton: *ibid.*, p. 13.

<sup>4</sup>Theophilus Lucas: "Memoirs of the Lives, Intrigues and Comical Adventures of the most Famous Gamesters and Celebrated Sharpers in the Reigns of Charles II, James II, William III and Queen Anne." London, 1714.

<sup>5</sup>Ashton: *ibid.*, p. 41.

<sup>6</sup>Ashton: *ibid.*, pp. 45 ff.

fluence that the practice exerts upon her.<sup>1</sup> In the reign of George II the state of affairs continued as in previous reigns. A letter in the *Grub Street Journal* says, "The canker of gambling is surely eating into the very heart of the nation."

Gambling houses kept by women which had long existed and for a period were closed, were reopened at the end of the 18th century.<sup>2</sup> Gambling at this period was the chief amusement of women, as well as of men. Says Steinmetz: "At social gatherings it was vain to attempt conversation. The intellectual was inhibited by the impulsive. The time presents a picture of dissolute manners, as well as furious party spirit. The most fashionable ladies were immersed in play. The Sabbath was disregarded and moral duties neglected."<sup>3</sup> Seymour Harcourt in his *Gaming Calendar* (1820) gives a vivid picture of the universality of the habit among all classes in the latter part of the 18th century. Gambling clubs, which later played so great a rôle, began now to rise into prominence. Two of these, White's and Brook's, deserve especial mention. "It was at White's Club that play was carried on to an extent, which made ravages in large fortunes, the traces of which have not disappeared at the present day. It was at White's that General Scott won £200,000. It was at Brook's that Charles James Fox, Selwyn, Lord Carlisle, Lord Robert Spencer and other great Whigs won and lost hundreds of thousands. The number of great men who played heavily, the number of fortunes wrecked at this time, is almost incredible."<sup>4</sup> The Duke of Wellington in his early career lost a large sum of money at play, and was on the point of selling his commission to relieve himself from his debts of honor.<sup>5</sup> Duels and suicides caused by gambling were common, as is shown by the *Annual Register*.

In the early part of the 19th century the passion had not abated. Ashton says: "The west end of London literally swarmed with gambling houses." One writer speaks thus of these gambling hells: "To these places thieves resort and such other loose characters as are lost to every feeling of honesty and shame. A table of this nature in full operation is a terrific sight; all the bad passions appertaining to the vicious propensities of mankind are portrayed in the countenances of the players. . . . Many in their desperation strip themselves on the spot of their clothes, either to stake against money or to pledge to the keeper of the table for a trifle to re-

<sup>1</sup> Ashton: *ibid.*, pp. 55 ff.

<sup>2</sup> Ashton: *ibid.*, pp. 76 ff.

<sup>3</sup> *Ibid.*, Ch. VI, Rise and Progress of Modern Gambling in England.

<sup>4</sup> Ashton: *ibid.*, cf. Chapter VI on these clubs.

<sup>5</sup> Reminiscences: 3rd sec. Quoted from Ashton, *ibid.*, p. 99.

new their play, and many instances occur of men going home half naked, having lost their all."<sup>1</sup> Crockford's Club was the most noted of all the gambling houses in London. It is estimated that Crockford netted 300,000 pounds in the first two seasons alone. Ashton writes: "One may safely say without exaggeration that Crockford won the whole of the ready money of the then existing generation."<sup>2</sup>

The great gambling institution of England is that of horse-racing, or the turf, as it is commonly called. Every one has read of the famous English Derby. To-day, by means of a system of bookmaking, published in the daily papers, every one is enabled to gamble, and the extent of the practice is enormous. In the English Political Science Quarterly of November, 1900, attention is called to the extent and evil of this practice and an urgent plea made for reform.<sup>3</sup>

Brief reference only can be made to the few leading countries remaining. We know that the Russians, Italians, Spaniards and Japanese are all addicted to gambling. Alphonso X, of Castile, endeavored to prevent the practice, by founding in 1332 the Chivalric Order of the Band, in which it was forbidden. A further ordinance was issued by John I, King of Castile, in 1387, forbidding the subjects to play backgammon or dice. In 1506 because of the misery in Italy, arising from the indulgence of gambling, the Council of Ten forbade all forms of this play and all sale of dice and cards. This did not eradicate the evil. Toward the end of the last century gambling raged furiously at Venice. In 1774 the Graded Council ordered the close of a large public gambling house known as the *Ridotto*. To-day the State lottery in Italy is still in existence.<sup>4</sup>

The United States has not been excelled by the countries of Europe and Asia in their proneness to this form of play. Steinmetz says: "It is not surprising, that a people so intensely speculative, excitable and eager as the Americans, should be desperately addicted to gambling. Indeed, the spirit of gambling has incessantly pervaded all their operations, political, commercial, and social." We cannot go into the history here, but all know well the struggles our large cities have had and are still having to suppress this practice. Nor is it confined to large cities. The excessive gambling among the miners and lumbermen in the West is well known; the notoriety of Saratoga as a

<sup>1</sup> Frazer's Mag., 8, 191-206.

<sup>2</sup> *Ibid.*, p. 128, Ch. VIII, on Crockford's Club.

<sup>3</sup> Any one interested in history of the English turf is referred to Ashton's chapter on this and that of *Rouge et Noir*, Gambling World.

<sup>4</sup> Gambling World, p. 40-41. The reader who is interested will find in Steinmetz a chapter, Vol. I, Ch. XIV, on the laws against gambling in various countries.

great gambling resort a few years back is still fresh in our memories. A collection of stories by Mr. Lillard will give the reader an inside view of some aspects of the gambling carried on in the United States.<sup>1</sup> Mr. Lillard informs the writer that he has gambled and seen gambling in every State in the Union, and that the stories which he gives are very fair examples of many of his own experiences.

The history of lotteries and an account of the rôle they have played in society is a subject too extensive to be more than touched upon.<sup>2</sup> The lottery existed in ancient Rome and has flourished continuously until comparatively recent times. State lotteries have existed from the 15th century, and have been, in many countries, one of the chief sources of revenue. As an illustration of this, the following facts, of the part lotteries played in our own country, are instructive. MacMaster tells us that in 1790 cash had become so scarce that it was impossible to obtain money to pay the cost of local governments or to carry on works of public improvement, and that in consequence recourse was had to lotteries. "In a short time there was a wheel in every town large enough to boast of a court house or a jail. Wherever a clumsy bridge was to be thrown across a stream, a public building enlarged, a schoolhouse built, a street paved, a road repaired, a manufacturing company to be aided, a church assisted, or a college treasury replenished, a lottery bill was passed by the legislature, a wheel procured, a notice put in the papers, and often in a few weeks the money was raised.

It was the money collected from the sale of lottery tickets that Massachusetts encouraged cotton spinning, and paid the salaries of many of her officers, that the city hall was enlarged in New York, that the court house was built at Elizabeth, that the library was increased at Harvard, that many of the most pretentious buildings were put up at the Federal City. The custom, indeed, continued for several years, and the State wheel became as regular an item in the papers as the ships news or prices current."<sup>3</sup>

The following is a list of some of the lotteries and their purposes, collected at random by MacMaster from the newspapers for the year 1788-9: West River Bridge Lottery, Brattleborough, Vt.; Furnace Lottery, Fair Haven Iron Works, Vt.;

<sup>1</sup> *Poker Stories*, edited by J. F. B. Lillard. Francis P. Harper, publisher, 17 East 16th Street, New York.

<sup>2</sup> The reader is referred to Vol. I, Ch. XIII, in Steinmetz. To the *Gambling World*, by Rouge et Noir, Ch. VIII, for excellent accounts of lottery. Many excellent references may be obtained from Poole's Index.

<sup>3</sup> MacMaster: *History of the People of the United States*, Vol. I, pp. 587-8. New York, 1883.

Windsor County Grammar School Lottery, Vt.; Mass. Semi-Annual State Lottery; Leicester Academy Lottery, Mass.; Hartford Bank Lottery, to build a bank along Connecticut River at Hartford; Bell Lottery, to procure a bell for the German Reform Church (Maryland); Petersburg Church Lottery (Va.); Alexander Lottery, to pave certain streets; Fredericksburg Academy Lottery (Va.); Lottery to enable the Hebrews to pay the debt on their synagogue (Penn.); Lottery to build a city hall at Philadelphia; New York City Lottery to enlarge the city hall for the use of Congress.

The result of this was very injurious to industry and business, as a general rage for speculation arose among all classes. MacMaster says: "Farmers and artisans, tradesmen and merchants were neglecting their businesses to watch the drawings of innumerable wheels."<sup>1</sup> In 1817 lotteries still existed. "The lotteries were almost as bad as the dram-shops and tippling-houses. The depression and excitement, that so invariably followed the drawing, diverted the laborer from his work, weakened his moral tone, consumed his earnings, and soon brought him to pauperism."<sup>2</sup>

To realize the extent of gambling in Europe at the present time a few facts about the expenditure of the greatest of modern gambling resorts, Monte Carlo, are instructive.<sup>3</sup> The expenditure of the Casino runs into gigantic figures; for police and courts the administration pays per annum £20,000; for roads £8,000; for lighting and water £19,000; for clergy and schools £9,000; for maintenance of the Casino, including salaries, management, gardens, lighting, heating, etc., £800,000; for charity £6,000; for carnivals and prizes £11,000; for printing £2,000; for agents, pensioners, etc., £9,000; for the viaticum £12,000; for the reptile press £25,000; for theater and orchestra £40,000; an expenditure of upwards of £1,000,000. And yet the shareholders received in 1897 dividends to amount of £570,000. During 1891 the total revenue from the tables was a little over 23,000,000 francs. The dividends paid average about 38 per cent.

In closing this brief historical sketch the writer gives the following list of persons of note who have been especially addicted to gambling.<sup>4</sup> Guido, the great painter, Voiture, Montague and Des Cartes in early life, Cardan, Lords Halifax, Anglesey and Shaftsbury, Lord Carlisle, Selwyn, Charles James

<sup>1</sup>*Ibid.*, Vol. II, p. 23.

<sup>2</sup>MacMaster: *ibid.*, Vol. IV, p. 529.

<sup>3</sup>These figures are taken from Rouge et Noir's chapter on Monte Carlo in 'Gambling World,' pp. 254-5.

<sup>4</sup>Most of these are taken from Steinmetz's chapter on Gambling Poets, Savants, Philosophers, Wits, Statesmen. Vol. II, Ch. XI.



Fox, Wilberforce, Pitt, Sir Philip Francis, Horace Walpole, Marie Antoinette, Nell Gwynne. Webster and Clay, according to Lillard, were both great poker players.

*Anthropological.* The passion for gambling is nowhere so strong as among savage and barbarous races. The American Indians are the most desperate and reckless gamblers in the world. Some of them will not only lose all their possessions, but also will stake their wives and children and even their own liberty. The practice is thus a cause of much distress and poverty<sup>1</sup> in their families. Property changes hands with the greatest rapidity, a single throw at dice or a heat in a horse-race, often doubling the player's fortune or sending him forth an impoverished adventurer.<sup>2</sup> Among the Nahua nations the great national game is one played with a ball—the end being to throw the ball through a small opening—a feat seldom done except by chance. The successful player, Bancroft tells us, was made as much of, as the winner at the Olympian games. All classes gambled heavily on the issue. Among the Hurons the chief game is that of the dish (*jeu du plat*).<sup>3</sup> "Large parties assemble to play this, during which the people not only lose their rest, but in some measure their reason. The players appear like people possessed, and the spectators are not more calm. They all make a thousand contortions, talk to the bones, load the spirits of the adverse party with imprecations, and the whole village echoes with howling." The game is in great repute as a medicine, the gambling parties often being ordered by the physician. The people all convene in a hut, the sick being brought in on mats.<sup>4</sup> Among the Iroquois whole townships, and even whole tribes, play against each other. The assemblage would last sometimes eight days, meeting every day, every inhabitant of each township tossing the dice once.<sup>5</sup>

The Senecas had a popular belief that a certain gambling game would be enjoyed by them in the future life of the Great Spirit—which was an extravagant way of expressing their ad-

<sup>1</sup> Bancroft: *Races and Peoples*, Vol. I, pp. 113-114; 123, 219; 244; 353; 517; 587. Cf. also a paper by Stuart Culin, *Chess and Playing Cards*. Smithsonian Report, 1896. pp. 665-942.

<sup>2</sup> Stevens in *Pac. R. R. Rep.*, Vol. I, pp. 404, 412. Cf. Bancroft, Vol. I, p. 281, footnote.

<sup>3</sup> Bancroft, II, pp. 299-301.

<sup>4</sup> P. de Charlevoix: *Journal d'un Voyage dans l'Amerique. Septentrionale*, Paris, 1744, III, p. 257. Quoted by Stuart Culin, "Chess and Playing Cards." Smithsonian Inst. Rep., 1896. pp. 721-2. Brebeuf: *Relations de Jesuites, Relation de l'annee, 1636, Quebec, 1858*. p. 113. Quoted from Stuart Culin, *ibid.*, p. 722.

<sup>5</sup> Morgan: *League of the Iroquois*, Rochester, N. Y., 1851. Quoted by Culin, *ibid.*, p. 726.

miration for it. Among the Zúñis 'kicked stick' (Ti-kwa-we) is the great national game, and is indulged in from boys of five to men of forty. Every one, man, woman, and child, takes sides and gambles on the issue.<sup>1</sup> In many tribes women are as much addicted to this practice as men, and among some there are games peculiar to the women alone.<sup>2</sup>

Gambling is the chief recreation of the Malays of Sumatra, all classes indulging extensively in play. They risk high stakes on their success; in some instances a father will stake his wife or children; or a son, his mother and sisters.<sup>3</sup> The Battas are also passionate gamblers. "They do not hesitate to risk all they possess, and often stake their own person, and if unable to pay are sold as slaves."<sup>4</sup> The Javanese,<sup>5</sup> Balinese,<sup>6</sup> Sulus,<sup>7</sup> Bugis,<sup>8</sup> are all addicted to the practice. The ancient Mut-sams were inveterate gamblers, the gambling crowd being called together by the sound of the drum.<sup>9</sup> So also the Patagonians are much devoted to gambling, the women as well as the men risking their valuables.<sup>10</sup> Among the Usbeks, a nomadic people of Central Asia, the favorite game is the Ashik (*ahsek*—ankles bones of sheep) "played in the manner of European dice, and with a degree of passionate excitement of which one can form no idea."<sup>11</sup> So we find mention of gambling all over the world—among the Melanesians, Malaysians, Alaskans, Koreans, Hawaiians, African Negroes, in Brazil and in all the Latin Republics; amongst the natives of South America, amongst the natives of the Isle of Man, and even amongst the Icelanders.

The extremes, to which the gambler in his passion is led, are almost incredible. "It is well known that they have eaten up cards, crushed the dice, broken the tables, damaged the furniture, only to end in fights with each other."<sup>12</sup> We have record of a man who, enraged at play, jammed a billiard ball into his mouth, where it stuck fast until removed by a surgeon,<sup>13</sup> of one who, having put a candle into his mouth, chewed

<sup>1</sup> J. G. Owens: *Pop. Sci. Monthly*, XXXIX, pp. 39-50.

<sup>2</sup> Culin: *ibid.*, 751-4; Bancroft, *ibid.*, I, p. 244. Col. R. S. Dodge, thirty-three years among our wild Indians, pp. 325-333.

<sup>3</sup> A. Featherman: *Social History of the Races of Mankind*, Second Division, London, 1887, p. 302.

<sup>4</sup> A. Featherman: *ibid.*, Second Division. Malao-Melanesians, p. 325.

<sup>5</sup> A. Featherman: *ibid.*, p. 382.

<sup>6</sup> A. Featherman: *ibid.*, p. 404.

<sup>7</sup> A. Featherman: *ibid.*, p. 416.

<sup>8</sup> A. Featherman: *ibid.*, p. 448.

<sup>9</sup> A. Featherman: *ibid.*, Third Division, 1890, p. 16.

<sup>10</sup> A. Featherman: *ibid.*, Third Division, p. 489.

<sup>11</sup> Arminius Vámbéry: *Sketches of Central Asia*, London, 1868, p. 110.

<sup>12</sup> Steinmetz: *ibid.*, II, p. 50 ff.

<sup>13</sup> Steinmetz: *ibid.*, II, p. 52.

and swallowed it;<sup>1</sup> of a mad player at Naples, who bit the table with such violence that his teeth went deep into the wood, and who thus remained, nailed as it were, until he expired.<sup>2</sup> Steinmetz<sup>3</sup> gives cases where loss at play resulted in stupefaction—some players neither knowing what they did or what they said; of a case of a man who cut off all the fleshy part of one of his ears to obtain money to play; two cases of men who, having tossed for each other's money, tossed to see which one would hang the other, the loser actually submitting to be hanged.<sup>4</sup> Jean Barbeyrac cites a case of a man, who having gambled all his life, made in his will an injunction that his skin and membranes be used to cover a table, a dice box and draught board, and that dice be made out of his bones.<sup>5</sup> Archdeacon Bruges mentions a similar case. There are a number of examples of men who have staked their wives.<sup>6</sup> Parchasus Justus, who wrote a book to cure himself of the habit, tells of people who staked their teeth and eyebrows. Hyde found some Chinamen who staked the fingers of their hands; Schouten,—of Chinamen who staked the hairs of their heads.<sup>7</sup> A gambler has told the writer he has seen a man shot in a game of poker, and thrown into a corner, while the rest continued the play.

Col. Mellesh was asked what were his feelings when he entered the battle of Vermeira. "Precisely the same," he replied, "as those I used to feel when laying a tremendous stake at Maco."<sup>8</sup> Hon. Gen. Fitzpatrick once said: "If I could coin my heart and drop my blood into drachms, I would do it to play, though by this time I should probably have neither heart nor blood left."<sup>9</sup> It is not an uncommon thing for ruined gamblers to go and sit up night after night watching the play of others. Voltaire cites a case of an old woman, ruined by gambling, who offered to make soup gratis for the players provided she might look on the game.<sup>10</sup> Cotton in his "Compleat Gamester" writes of the passion as follows: "Gaming is an enchanting witchery, gotten between idleness and vice; an itching disease, that makes some scratch the head, whilst others, as if bitten by a Tarantula, are laughing themselves to death; or, lastly it is a paralytic distemper, which seizing the

<sup>1</sup> Dusaulx: *De la Passion du Jeu*. Cf. Steinmetz, *ibid.*, II, p. 54.

<sup>2</sup> *Gazette de Deux Point*, du 26, Novembre, 1772. Quoted from Steinmetz, *ibid.*, Vol. II, p. 53.

<sup>3</sup> *Ibid.*, II, p. 54 ff.

<sup>4</sup> *Annual Register*, 1812.

<sup>5</sup> *Traité du Jeu*, Tom. II, p. 338-9.

<sup>6</sup> Barbeyrac: *ibid.*, Tom. II, 342 ff.

<sup>7</sup> Barbeyrac: *ibid.*, Tom. II, p. 345.

<sup>8</sup> Frazer, 16, p. 16, Article, Anatomy of Gaming.

<sup>9</sup> Steinmetz: *ibid.*, I, p. 300.

<sup>10</sup> Steinmetz: *ibid.*, I, p. 66.

arm, the man cannot chuse but shake the elbow. It hath this ill property above all other vices, that it renders a man incapable of prosecuting any serious action, and makes him always unsatisfied with his own condition; he is either lifted to the top of mad joy with success, or plunged to the bottom of despair by misfortune; always in extremes, always in a storm; this minute the gamester's countenance is so serene and calm that one would think that nothing could disturb it, and the next minute so stormy and tempestuous that it threatens destruction to itself and others; and, as he is transported as he wins, so losing, is he tost upon the billows of a high swelling passion, till he hath lost sight of both sense and reason.<sup>1</sup> La Placette<sup>2</sup> says: "In order to conceive clearly the state in which the soul of the gambler finds itself, it is not sufficient simply to represent a sea always agitated; it is necessary to imagine that these agitations come from five or six opposite vents, which rule, each in its own course in such a way, that there is not one of them, which has not the advantage many times in the quarter of an hour." Barbeyrac writes: "I do not know if there is any other passion which allows less of repose and which one has so much difficulty in reducing." He cites anger as a passion of excessive violence, yet one which does not endure long in intensity; likewise ambition, and love. Each of these has its moments of cessation and decrease in intensity. "But the passion of gambling gives no time for breathing; it is an enemy which gives neither quarter nor truce; it is a persecutor, furious and indefatigable. The more one plays the more one wishes to play; one never leaves it, and with difficulty, one resolves to leave off a little while from dice and cards to satisfy the needs of nature; all the time he is not playing, the time seems to him lost; he is tired (*ennui*). When he does anything else; it seems that gambling had acquired the right to occupy all his thoughts. . . . Old age far from diminishing the ardor of this passion only results in re-enforcing it."<sup>3</sup> Steinmetz writes: "The gamester lives only for the sensation of gaming. Menage tells us of a gamester who never saw any other luminary on the horizon but the moon. St. Evremond says: 'All the rays of the gambler's existence terminate in play; it is on this that the center of his existence depends. He enjoys not an hour of calm serenity. During the day he longs for night, and during the night he dreads the return of day.'"<sup>4</sup>

<sup>1</sup> Cotton: *Compleat Gamester* (1674). Quoted from Ashton, *ibid.*, pp. 1-2.

<sup>2</sup> *Traité des Jeux de Hazard*, Ch. VII, p. 225 (or Ch. IX, p. 91 second Ed.) from Jean Barbeyrac, Tom. II, p. 236.

<sup>3</sup> *Ibid.*, pp. 336-38, Tom. II.

<sup>4</sup> Steinmetz: *ibid.*, Vol. II, Ch. III.

*Section 2.* In order to obtain data in regard to the tendency to run risks in every day life the following syllabus was circulated:

### TOPICAL SYLLABUS.

#### PSYCHOLOGY OF UNCERTAINTY.

I. Are there times when you desire to risk something, take chances—materially, socially, spiritually; have an impulse to act in total ignorance of consequences? State frequency and strength of such impulses. Describe any case in your life when you have so acted. State your feelings when you had given in to the impulse. If result was good, how affected? If bad, how? Effect on future acts? In taking risks have you been more successful or unsuccessful as a rule?

II. Give any case where of two or more possible lines of action you have chosen one off hand and trusted to chance, *e. g.*, in deciding on a school or college, profession, how to spend vacation, or any decision of major or minor import in which you were actuated more by impulse than from data. State your feelings after the decision, *e. g.*, satisfied or dissatisfied, worry or relief, determination to act decreased or increased. Give any instance in your life where such an impulse to act and trust to chance has interfered with thinking out, or working out, to its end, some uncertain matter. Do such impulses influence you to decide or act before looking at the matter from all sides? Do you ever come to a decision by tossing up a coin?

III. Describe your habits of action in little affairs such as going out without rubbers, coat or umbrella, sitting in draughts, taking chances of its not raining or your not catching cold. Describe a case of person who acts thus habitually—saying "Oh I'll be all right." Give case of opposite type who runs no risks, wants insurance and security in everything.

IV. Do you like to know far ahead what you are going to do or what is going to happen? Do you make certain definite arrangements very far ahead, *e. g.*, as to how spend vacation, etc.? Is desire to be uncertain dependent on whether you feel cheerful and hopeful, or despondent melancholy? If so, which? Name any things you would prefer to be certain about. Some—uncertain. How about future state after this life? In this life?

V. Do you ever have idea of putting aside a certain portion of your income to devote to speculation? Describe any case in your own experience or in that of another speculating. Did stick to limit set? Win or lose? Effect in either case on conduct, *e. g.*, general bearing toward fellows, future speculation. If lost was he unconsolable, indulging in self pity?

VI. (a) Give a case of person—continually and by nature lucky. One of person who imagines himself lucky. Cases of opposite. Are you as a rule lucky?

(b) Are there days when you get up in the morning and feel: To-day I will be lucky? How are actions affected, *e. g.*, act bolder, more likely to venture? Give a specific case—your general state of feeling, any previous events acting as a cause, etc.

(c) Give any instance in which winning at a game of chance, being successful after having run a risk, encouraged you in your exertions or led you to undertake what you lacked confidence for previously. If you do not remember any case, state feelings in general following the success of an uncertain undertaking.

(d) Comment on your feelings of safety when going on cars or water, running risks of any kind. Do you dislike being cautioned to be careful? What is the effect of such caution?

VII. (a) In hearing about "breaking bank at Monte Carlo" or of some lottery did you ever have the thought come—"I believe I would be the one to break the bank or win the prize?" Comment on your feelings here. Is there a tendency, you have to guard against, to venture on lottery schemes and the like? Have you ever gambled in any form whatever or even made believe you were gambling?

(b) Do you ever have idea that some day things are coming your way, something going to turn up? Comment.

In all 443 returns were received. Of these 70 were males; 340 females; in 33 cases the sex was not given. The answers fall within three groups. (1) A group in which the subjects have frequent and strong impulses to break away from their daily routine and enter on some venturesome undertaking. In this group is found a fairly strong habit of risking. This comprises about 18.6% of the whole number. (2) A group in which subjects are extremely cautious and feel strongly averse to taking any risk. This group comprises 12%. (3) A group wherein there is exhibited no marked inclination or disinclination to run risks; in this group the subjects often enter upon risky undertakings with a certain degree of enjoyment, but are as apt not to take the venture as to take it. In small affairs they are not over cautious, but in large ones, where much is to be lost or won, they hesitate to venture; and unless the object to be gained is something greatly desired they choose not to run the risk. This group comprises 69.4% of the whole. There were 238 cases cited, or nearly 58% of subjects who frequently took risks in small affairs, as going without rubbers, etc. There are 115 cases, or 28%, where caution was exhibited in these small affairs. In the remaining 24% taking risks or exercising caution depended on the mood. In 224 cases caution from some other person was much disliked. In 52 cases no dislike of being cautioned was felt. In 64 cases being cautioned made more reckless, and in 29 cases the subjects did the thing they were cautioned against. In 75 cases subjects are influenced to be more cautious because of failure in their previous risks. In 91 cases subjects are influenced to be more venturesome because of success in previous risks, and in 24 cases subjects even when successful are inclined to be more cautious because of the worry, fear and strain. There were 121 cases where subjects decided affairs off hand, that is they trusted to chance rather than reasoning over the matter in all its aspects. There were 111 cases where tossing a coin or the like was resorted to as a means of deciding small affairs. There were 107 cases of persons who had gambled more or less, and 27 cases where persons had made believe gamble. Of 162 cases of persons who answered as to whether they believed themselves more successful or reverse in taking risks—109 considered themselves more successful; 53 less.



The following is an enumeration of some affairs decided off hand:

In deciding on the advisability of going to a certain place as an entertainment, etc., 56 cases; in choosing a school, 25 cases; in deciding on the manner of spending one's vacation, 20 cases; in choosing a profession, 8 cases; in buying a dress, 6 cases; in deciding on a course of study, 4 cases; in choosing between two schools to teach, 2 cases; neglecting bad eyes, 2.

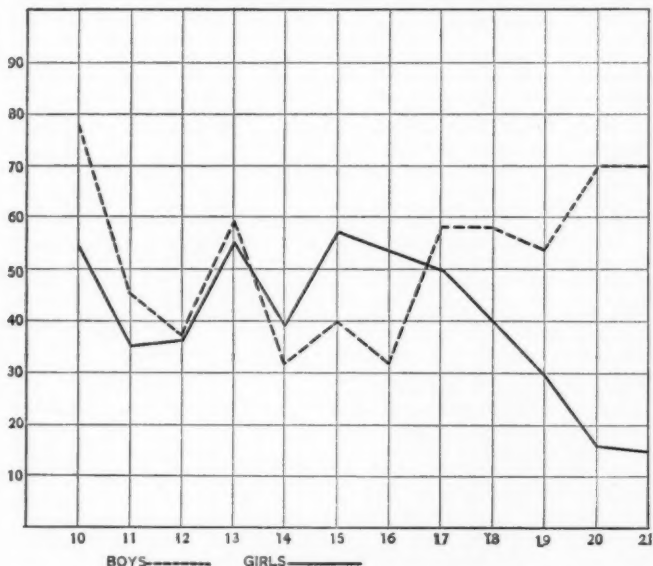
Below is an enumeration of some common risks taken:

Entering a class unprepared, hoping not to be called, 72 cases; taking chances at fairs, betting, 29 cases; going to places which are forbidden, trusting not to be caught, 25 cases; entering on an outing when weather threatens, rain or storm, 19 cases; breaking rules of school, 17 cases; tossing penny or drawing lots to decide who will perform some obnoxious task, 15 cases; skating on thin ice, 10; taking risks on water, 10; in playing cards, 10; in bicycle riding, 10; in buying articles, 10; wearing thin dresses in winter, 7; running in front of trolley car or wagon, 6; risking being late to catch a train, 6; crossing dangerous bridges, 4; going out in a bad storm, 4; smoking, trusting that they would not be detected, 3; going out with a severe cold, 3; take risk of being met at train, 3; driving a fractious horse, 2; going out when visitors were expected, risk getting back, 2; taking horse when did not know whether it was needed, 2; running the risk of offending friends, 2; neglecting bad eyes, 2; one each—kissed a friend who had typhoid fever; jumping from high window; went on a rickety toboggan slide; risked losing dinner; took risk of ticket being good on a certain train; removed brace on teeth; climbing high trees; delayed taking train expected to be met on; took chance of succeeding in a school other teachers had been failing in; rode a horse who always tried to run away; doing daring things in gymnasium; man who works in Turkish bath goes out on street late at night with only a towel about his loins; rode horse afraid of cars along railroad track; driving horse down a steep hill without any breeching; going out, risk some one's coming who am desirous of seeing; jumping from a fast moving train; jumping from high trees; dropping from beams in the barn; diving into water from high spring board or over over-hanging trees; risk being late for recitation; go to see some one at a distance, risk their being in; cutting out a dress without a pattern, trusting it will be right; going away from home and leaving babies with the younger children; wearing sister's clothes; climb in dangerous places; starting on expeditions with little money; risks in business, trusting men know nothing about; crossing a high long railroad bridge; walking on slippery logs across water; wear new dress in rain to party; coasting on a dangerous, forbidden hill at night; in case of sickness do not send for doctor; entered upon a normal course without assurance of assistance; stopped a runaway team hitched to a bindery, but had to run in front of the knives; riding on an engine; jumping off and on moving cars; buying a wheel.

To arrive at some further knowledge in regard to the tendency to take chances, especially among boys and girls about the period of adolescence, the following question was given:

"Suppose two days vacation was offered you, and suppose I came to you with two slips of paper in my hand, a long slip and a short slip, and said, 'If you draw the long slip, instead

of two days, you can have three, but if you draw the short slip, instead of two days, you can have only one. You are free to draw or not. Will you draw?" All question of the moral right or wrong in drawing was, as far as possible, eliminated, also those cases in which the student preferred the short vacation to the long one. In all 776 answers were received from students, ranging from 10 to 22 years of age; boys, 370; girls, 406. Of these, 176 of the boys answered yes, 194, no; and 183 of girls answered yes; 223, no. These figures tell little, but the following curves, showing the answers by ages, are of interest.



Though these curves have little scientific validity, due to the smallness of the numbers, yet they present certain interesting and suggestive features. The fact that the boys' curve rises, as the ages approach those of maturity, we believe to be in line with the general biological thesis of the male being the more iconoclastic, exploiting and venturesome element, while the fact, that the curve of the girls falls, is, on the other hand, in line with the biological thesis, that woman is the conservative and cautious element. It is interesting to note that the boys' curve is lowest at the ages 14, 15, 16, that period which coincides with the average age of puberty, a period in which we know

that feelings of uncertainty, vague fears, etc., are rife. At 17 the boys' curve takes a rapid rise. So with girls at the ages 11, 12, and 14, the curve is low—being at 14 at its lowest point—after which it takes a sudden rise, being at its highest point in years 16, 17, 18. We know that after the dawn of the adolescent period there is a great rise in feelings of self-confidence, power, etc. This may account for the curve being at a high point at this time with the girls, and also the sudden rise of that of the boys at 17. The girls' curve being high at 13 may be in an apparent contradiction to these suggestions; however it may be that these girls already had past the period of storm and stress, incident on the dawn of adolescence.

Inadequate as the above data are in point of number, range of age and sex, and trivial as they appear, they nevertheless are of much suggestive value. The solution of the problem of why certain people are inclined to run risks, why they have so strong a belief in their luck, has not a little light thrown upon it by considering these trivial circumstances. We see how strongly they influence future actions and feelings—a little success often raising up a great wave of confidence, a little failure causing great caution and fear. The feeling is far out of proportion to the stimulus. The fact is that we are playing on the two great hereditary chords—fear and faith, as regards personal safety—each of which in turn controls our actions. It is these slight circumstances which exercise and give growth to these factors, and if each man were constitutionally inclined, neither strongly towards the one or the other, the one of these excised the most, *i. e.*, the weight thrown on the fear side or faith side, according to failure or success, would grow most rapidly, until by little increments of success or failure one would find himself an optimist or a pessimist—with strong belief that the powers of the universe were for or against him. But probably no two start out with equal endowments of the hereditary faith and fear instinctive tendencies. The whole matter seems to center about these two pivots—faith in self—and distrust of self. On the one side we have the man who enjoys taking risks, who says he is, as a rule, successful; who thinks he is lucky; that something, some day, is coming his way; who is careless in little affairs of health, has strong faith that he will be admitted to heaven, and in general feels he is a "Glückskind." On the other, the opposite who is always cautious, and fearful, who, even when successful in taking risks, cares not to take them again because of the worry and strain; who is a little uncertain about heaven, and is inclined to think that he is unlucky and never had an idea of anything occurring in his favor.

The conditions, under which the impulse to take risks arises,

are of interest, as it seems to occur when the affective curve of pleasure-pain is at its highest or lowest point—in a state of extreme good feeling or bad, when either joyful or sorrowful, when fatigued; one case when the person felt she was about to fail in something. There seem to be two especial ends in view—one the love of an uncertain state of mind and the charm of danger, with the resulting mental and bodily tension and suspense; the other a semi-unconscious yearning toward the "Ground" of things, to get a clue to my relation thereto—am I lucky or unlucky? to get a conviction of safety, a play upon the two instinctive factors of action and passion—faith, and fear.

*Section 3.* Psychological theories of the gambling impulse are few in number and inadequate in treatment. What little the writer has found is summed up in the following. Steinmetz gives these points: (1) A desire for a stimulus to call forth the natural activity of the mind; indolence, vacuity—being the cause. (2) Love of wealth. (3) It intensifies and gives rise to such feelings as vanity, curiosity, surprise.<sup>1</sup> Another writer<sup>2</sup> says that the passion is due (1) "to avarice—as promising either a vast accession of wealth, or a short road to the possession of it;" (2) to a deficiency in what in physics is called a stimulus.

Ribot, speaking of plays and games in general, says: "This last item (games of chance) alone might prove a tempting one to a psychologist. It has a quasi-passive, somewhat blunted form which Pascal called a diversion (that which turns aside, distracts), a way of pretending to work, or filling up the blanks in existence, of 'killing time.' It has an active form, the gambling passion whose tragedy is as old as humanity, and which is made up of attraction toward the unknown and hazardous, of daring, emulation, of the desire for victory, the love of gain, and the fascination of acquiring wealth wholesale, instantaneously, without effort. These and other elements show that in play, as in love, it is complexity which produces intensity."<sup>3</sup>

A writer in the *Spectator*<sup>4</sup> takes up arms against those who attribute the impulse to avarice. (1) "No really avaricious person ever gambles, for the pain of paying his losses overcomes both the pleasure of the game and the pleasure derived from winning." (2) "Nor is gaming a mark of inner effeminacy, of a desire for excitement to be gained without exertion." He cites Bismark and Count Cavour, men of the greatest

<sup>1</sup>*Ibid.*, Vol. I, p. 24.

<sup>2</sup>Nimrod: *Anatomy of Gaming*, *Frazer's Mag.*, Vol. XVI, pp. 9-24.

<sup>3</sup>*Psychology of the Emotions*, New York, 1897, p. 31, footnote.

<sup>4</sup>*Spectator*, Vol. LXVI, p. 286. "The Gambling Instinct."

energy—addicted to high play. (3) "Nor is the gambler at heart a cheat." (4) "The true temptation is the desire which prompts most men to drink hard,—love of excitement, a desire to forget self and be rid of the monotony of the common place." Apropos of the above is the observation of Drähms, who says: "The professional gambler is prodigal and generous, especially toward those in distress, and for religious and moral purposes."<sup>1</sup>

Prof. Lazarus's treatment<sup>2</sup> contains the following points: (1) The state of tension (*schweben*) is sought; avarice being entirely subordinate. (2) Hope and fear are dominant states—with especial emphasis on hope. He thinks the state lottery partially justifiable because it gives the poor people something to hope for. "Man can live without pleasure, but not without hope." (3) Gambling satisfies the positive attraction for danger, present in many men. (4) It satisfies the feeling that we are lucky; emphasizes the efficacy of the idea of Fate in overcoming the idea of blind chance; is the abandonment of reason and giving oneself up to superstition.

Mr. Thomas, in a paper in the *American Journal of Sociology*,<sup>3</sup> gives some interesting points in regard to the gambling instinct. He bases the instinct primarily on what he calls the conflict interest, which will be best understood by quoting his own words: "There could not have been developed an organism, depending on offensive and defensive movements for food and life, without interest in what we call a dangerous and precarious situation. A type without this interest would have been defective and would have dropped out in the course of development." That this interest prevails, he considers "a sign of continued animal health and instinct in the race." Thomas also lays stress on the desire to get rid of routine,—pointing out that those professions in which there is an element of work and uncertainty, are more popular and more often chosen, as competitive business, the stock market, the learned professions; and among the less intelligent—the callings of policemen, firemen, detectives, livery stablemen, barkeepers, barbers. He sums up: "Gambling as a means of keeping up the conflict interest, and of securing all the pleasure-pain sensations of conflict activity with little effort and no drudgery; and, incidentally or habitually, it may be a means of securing money." He believes—"the instinct is born in all normal persons. It is one expression of a powerful reflex, fixed far back in animal experience. The instinct is, in itself, right and indispensable, but we discriminate between its applications." He holds that the gambler by profession is

<sup>1</sup> The Criminal, New York, 1900, p. 119.

<sup>2</sup> Prof. M. Lazarus: *Reize des Spiels*, Berlin, 1883, pp. 58-88.

<sup>3</sup> Vol. VI, pp. 751-763. The Gambling Instinct, W. I. Thomas.

often of a high type of man—intelligent, and not degenerate. There is no special gambling type; at worst, he is but representative of a class of men who have not been "weaned from their instincts."

In the following the writer attempts to analyze the factors involved. His conclusions are based on questioning and correspondence with some twenty gamblers, on personal observations in gambling resorts, on a large amount of literature, historical and descriptive, on an analysis of over a hundred stories of gambling, written by gamblers,<sup>1</sup> and accounts of the lives of gamblers.<sup>2</sup>

The psychic attitude toward uncertainty—the state of suspense—is the most natural starting point.

Prof. Lazarus says: "The pleasure in all chance plays consists fundamentally in suspended activity; in dice, roulette, and faro, nothing of more importance can be discovered than the mental tensiety because of the question: 'Will it be seven or eleven; a little or a great number?' This 'oder' (either—or) is a mighty psychological force, an irresistible attracting magnet."<sup>3</sup> We have here curiosity and something added—the feeling of expectation in which, as Wundt says, we outrun the impressions of the present and anticipate those the future will bring, and if the result is postponed there arises strained expectation, in which the muscles are held tensed like those of a runner awaiting the signal for the race, although very possibly the impression demands no motor response whatsoever.<sup>4</sup>

When the stake is added there arises all the pleasure of pursuit with increase of intensity, for as Bain says: "An element of uncertainty increases the interest of pursuit by making it more exciting; . . . absolute certainty unduly relaxes the bodily and mental strain that is needed for the maximum of gratification."<sup>5</sup> "The purest form of pleasurable excitement," says Sully, "is afforded by a set of circumstances which opens up a number of possible issues though we have not the knowledge to determine which is most probable."<sup>6</sup> We have here ideal conditions for arousal and imagination.

A case is reported of a man who for many years was a spectator at one and the same table without participating in the

<sup>1</sup> Curtis: *Queer Luck*; J. F. B. Lillard, *Poker Stories*, New York, 1896, pp. 231; Clarence L. Cullen, *Taking Chances*, New York, 1900, pp. 269.

<sup>2</sup> Especially the "Lives" of Lucas, *ibid.*

<sup>3</sup> *Reize des Spiels*, p. 59.

<sup>4</sup> *Lectures on Human and Animal Psychol.*, London, 1897, p. 376.

<sup>5</sup> *Emotions and Will*, London, 1899, pp. 220 ff.

<sup>6</sup> *Sensation and Intuition*, p. 298, cf. Bain, *ibid.*, p. 222.

play. A dispute arising, he was asked to make a decision, as he must know best the laws of the game. He replied that he did not know the game; that he had only looked on to observe where the best cards fell.<sup>1</sup>

At any gambling table, where it is permitted, you will observe spectators watching with strained attention to see where the wheel will stop or which card will turn up. The writer has found it difficult to leave such a table after standing a few minutes merely to observe what number will win next. In any uncertain event there is the same attracting force, and although one may have no interest in either side, there is always a tendency to speculate on the outcome. This constitutes a large part of the philosophy of life, resolving the uncertainties into certainties. George Eliot writes: "So absolute is our souls' need of something hidden and uncertain for the maintenance of that doubt and hope and effort which are the breath of life, that if the whole future were laid bare to us beyond to-day, the interest of all mankind would be bent on the hours that lie between; we should pant after the uncertainties of our one morning and of our one afternoon; we would rush fiercely to the exchange for our last opportunity of speculation, or success, or disappointment, we should have a glut of political prophets, foretelling a crisis or a no crisis, within the only few hours left open to prophecy."<sup>2</sup>

The race has been evolved in an environment of uncertainty, and it may be that such an environment has thus become indispensable. It cannot be doubted that the state of mental tension, of being on the alert with ears pricked and nose in the air, is a factor of high selective value. We have reason to believe that this state of expectation not only links together and sets in a condition of unstable equilibrium motor centers, but also that in the higher association centers there is a preparatory condition produced. On this assumption the metabolism of both brain and body would be increased, and consequently the potential efficiency of the given moment. Not only reflex action and muscular co-ordination, but also memory, imagination, and judgment times would be quickened. Is it not thus that a condition of uncertainty holds the mind in a tonic and unrelaxed condition? As evidence that, as we approximate a dead level certainty, we tend to lose in mental efficiency, we have the case of the arrested development of the Chinese. It is significant in the case of the Chinese that the passion for uncertainty, having no exercise in the serious side of life, shows

<sup>1</sup> Lazarus: *ibid.*, p. 58.

<sup>2</sup> The Lifted Veil. In Silas Manner. Clerical Tales. p. 190. Hurst and Co.



itself in the form of play—they being the greatest gamblers in the world. It is then this need of mental tension, this "either—or" state, which is one of the chief factors in chance games and gambling.

The addition of the stake brings in a whole train of added states centering about the feeling of power. Hope and fear, joy and sorrow—are especially predominant. It is significant to note that hope must at the moment of action predominate over fear—a necessary biological condition of all action in uncertainty. Again in connection with this playing power, we find arising emulation, aggression, the instinct of domination, with the love of humiliating one's opponent, much allied to the bullying and teasing tendency, pugnacity—with all the resulting emotions.<sup>1</sup> Jealousy and envy are especially strong in the mind of the loser. In the great American game—Draw Poker—the battle element is especially predominant. It is here also that the "bluff" plays so great a role—the attempt to beat your opponent by sheer boldness and self-confidence. The psychic effects of this are significant. It makes the man who bluffs play better and the opponent play worse. The psychic effects of the bluffer in every day life only need to be mentioned.

There are many minor factors indispensable to the success of the gambler,—the cultivation of a calm and passionate demeanor in moments of crisis, never displaying any emotion or hesitancy; the ability to recover quickly from defeat; being ever vigilant and attentive; acquiring the habit of studying your opponent most closely; few men being better "sizers up" of men than the gambler; a sufficient degree of caution tempering your boldness; the learning how to bear sanely good fortune, as well as bad. These fit closely the essentials of any active, exploiting life. But for its costliness and dangers, no better education for life among men could be devised than the gambling table—especially the poker game.

The phase of gambling known as betting is important. The practice is very ancient. At one time in England it became a mania.<sup>2</sup> It has its basis in the tendency to make dogmatic statements on the outcome of uncertain events and the strong inclination to throw your lot in with one possibility. Dr. Small in his monograph on certainty, in which he showed the tendency to make strong assertions regarding certain events, only stated half the truth. The whole history of partisanship, dogmatism and fanaticism is in point, for these are but an out-

<sup>1</sup> The reader is referred for a more lengthy account of the battle element to Mr. Thomas's article, *Gambling Instinct*, *Amer. Jour. of Sociol.*, Vol. VI, pp. 751 ff.

<sup>2</sup> Early part of the 18th century, cf. Ashton, *ibid.*, chapter on Betting.

crop of this tendency plus some interest at stake. Its simplest form is the "I'll bet you" one hears a dozen times a day. A man often will take either side, but after backing one he is apt to believe in it. The wide pedagogical and ethical bearings are evident.

The possibility of getting something for nothing, and that quickly, is another of the salient features in gambling. It is the basis of the stock exchange, of many exploring expeditions, the explanation of such phenomena as the Keeley motor, the Miller syndicate, Mrs. Howe's bank, the Rev. Mr. Jernegan's scheme of obtaining gold from sea water, etc. The credulity of people in the presence of such frauds is most wonderful. This speculating tendency has two or three times in the course of history manifested itself in an extraordinary degree. Two of these, the South Sea Company, better known as the South Sea Bubble, and John Law's Mississippi scheme, all but financially wrecked England and France, respectively.

John Law, who in 1817 was in control of the French finances, issued bonds on large tracts of land along the Mississippi River. The paper was in the shape of stocks, bearing interest. The scheme worked so well, Law issued a second large amount. The whole French people went mad in speculating. McKay<sup>1</sup> says: "People of every age and sex and condition in life speculated on the rise and fall of these bonds. . . . There was not a person of note among the aristocracy, except the Duke of St. Simon and Marshall Villars, who was not engaged in buying and selling stock. Gamblers with their roulette tables reaped a golden or rather a paper harvest from the throng." Wood says: "The frenzy prevailed so far that the whole nation—clergy, peers and plebians, statesmen, princes, nay, even ladies, turned stock jobbers."<sup>2</sup> It is worthy of note that Law was a Scotch adventurer, and had been for many years a gambler.<sup>3</sup>

About the same time in England the South Sea Company began to sell stocks, claiming the company had rich lands in the South Seas, and promising enormous dividends. McKay writes: "It seemed as if the whole nation had turned stock jobbers. . . . The inordinate thirst for gain affected all ranks of society. . . . Besides the South Sea, innumerable other companies started up everywhere. There were nearly a hundred of these projects or bubbles—extravagant to the last degree, yet the people were hypnotized by the craze of speculation. . . . It has been computed that nearly

<sup>1</sup> *Memoirs of Extraordinary Delusions*, Vol. I, p. 14.

<sup>2</sup> J. P. Wood: *Memoirs of John Law*, Edinburgh, 1824, p. 14.

<sup>3</sup> H. D. Adams: *Under Many Flags*, New York, 1896, p. 174, cf. also Wood, *ibid.*

one million and a half sterling were won and lost by these practices. . . . In the heyday of its blood, during the progress of this dangerous delusion, the manners of the nation became sensibly corrupted. . . . It is a deeply interesting study to investigate all the evils that were the result. Nations, like individuals, cannot become gamblers with impunity."<sup>1</sup> Another of these great speculating crazes was the tulip mania in Holland in the 17th century.<sup>2</sup>

The following figures show how this speculating tendency pervades the commercial world as represented in the Stock Exchange. The legislative committee of New York reported that in the three years preceding 1882 the optional cash sales of wheat in the New York Produce Exchange amounted to \$244,737,000, while the total of optional sales of all kinds during the same period rated up to the enormous sum of \$1,154,367,000. The United States Cotton Commission, sent to investigate the New Orleans cotton deal, in 1892, reported 52,000,000 bales as being disposed of on the New York Exchange, and 16,000,000 in the New Orleans, or 68,000,000 in all. As a matter of fact but *seven and three-fourths* millions bales all told were raised in the United States during that period, and a little over 400,000 of these were sent to New York. The surplus in both cases represent bogus sales. This is gambling on the largest scale, and that done in the name of legitimate business.<sup>3</sup>

*Section 4.* A feature closely allied with that of the state of tension, and largely influential in increasing it, pervades and permeates the whole fabric of the gambling impulse—that of luck. The term luck is used here in a large sense to include a group of phenomena very significant in the study of chance. It is this group of phenomena which it is the purpose of the present section to attempt to explain in its biological origin and values. As a foreword, I would like to lay especial emphasis on the implications of natural selection in respect to the presence of long existing and strongly tenacious psychic manifestations—to wit, that such manifestations are based upon psychic variations which must have been of use in the biological economy and thus have been of high selective value. The greater their permanence, and the stronger their tendency to express themselves, we must conclude that proportionately great was their importance in determining the fitness and survival of their possessors. Bearing this in mind through the ensuing

<sup>1</sup> *Ibid.*, Vol. I, pp. 67-69.

<sup>2</sup> McKay: *ibid.*, Vol. I, p. 89.

<sup>3</sup> The article by Mr. Thomas (Amer. Jour. of Sociol., Vol. VI, pp. 751 ff.) speaks of this desire to get rid of routine and the interest in those forms of acquiring money—based on speculation and hazard.

chapter let us glance at some of the phases of those psychic manifestations which we will group under the term luck.

Father Lalemont,<sup>1</sup> in describing gambling among the Indians, tells how they prepare for the game: "They pass the night in shaking to find who is most adroit in spreading out their charms and exhorting them. They abstain from their wives, fast, sleep in the same cabin,—all this to have a lucky dream. Everything they dream would bring them luck is brought to the game in bags. They also bring to the game any old men who are supposed to have charms. When the game begins every one sets to praying and muttering, . . . with gestures and violent agitations of the hands, eyes and entire face, all for the purpose of attracting good fortune to themselves and exhorting their particular spirits to take courage and not let themselves be worried. Some are appointed to utter execrations and make contrary gestures for the purpose of forcing bad luck upon the other side and frightening the familiar spirits of the opposite party." This is a typical example among many to be found in the anthropological literature.

Richard Proctor<sup>2</sup> gives the following five things that gamblers hold: (1) Gamblers recognize some men as always lucky—as always "in vein."<sup>3</sup> (2) Gamblers recognize those who start on a gambling career with singular luck, retaining that luck long enough to learn to trust in it confidently, and then losing it once and for all. (3) Gamblers regard the great bulk of their community, as men of varying luck—sometimes "in vein," sometimes not; men, who if they are successful, must, according to the superstitions of the gambling world, be most careful to watch the progress of events. If men will not withdraw when they are not "in vein," gamblers believe they will join the crew of the unlucky. (4) There are those, according to the ideas of gamblers, who are pursued by constant ill luck. If they win in the first half of the evening, in the last half they will lose more. (5) Gamblers recognize a class who, having begun unfortunately, have had a change of luck later, and have become members of the lucky fraternity. This change they ascribe to some action or event. For instance, the luck changed when the man married, his wife being a shrew; or because he took to wearing waistcoats; or because "So and So," who had been a sort of evil genius to the unlucky man, had gone abroad or died. Then there are espe-

<sup>1</sup> Culin: *ibid.*, p. 722.

<sup>2</sup> Luck: Its Laws and Limits, Longman's Magazine, Vol. VIII, pp. 256-269.

<sup>3</sup> The term "in vein" is difficult to translate. If a man is "in vein," luck favors him and he is sure to win. When he loses it is thus always attributed to luck.

cial phases in the belief in luck. Some believe that they are lucky on certain days in the week, unlucky on others. The skillful whist player, under the name of Pembridge, believes that he is lucky for five years; then unlucky for five years, and so on. Bulwer Lytton believed that he always lost at whist when a certain man was at the same table, or in the same room, or even in the same house." Mr. Proctor considers this belief in luck to be "the very essence of the gambling spirit." Robert Houdin gives the following maxims which he obtained from a gambler. The first three deal with the kind of game a man should play, that he should be calm and cool and not play for pleasure:

(4) A prudent player should put himself to the test to see if he is "in vein." In all cases of doubt you should abstain.

(5) There are persons constantly pursued by bad luck. To such I say—"Never play." (6) Stubbornness at play is ruin. (7)

Remember that fortune does not like people to be overjoyed at her favors, and that she prepares bitter deceptions for the imprudent who are intoxicated by success. Mr. Houdin sums up: (8)

"Before risking your money at play you must deeply study your 'vein' and the different probabilities of the game." The fol-

lowing is a typical case of the superstitious gambler: "This man believed that his clothes had an influence on his luck. If luck followed him he would wear the same clothes whether they were adapted to the weather or not. The same man believed in cards and seats. He objected to any one making a remark about his luck. He had the strongest objections to our backing him. He was distressed beyond measure if any touched his counters. His constant system of shuffling the cards was at times an annoyance. This was a great card player."<sup>2</sup>

Miss Bergen<sup>3</sup> found the following superstitions to be current among gamblers and card players: (1) If your luck is poor walk around your chair three times, lift it, sit down, and your luck is secured (Gen'l in U. S.). (2) It is bad to play against the grain of the table (Gen'l in U. S.). (3) It is unlucky to turn up your hand before the dealer is through (Alabama). (4) It is common to blow on the deal without looking at it for good luck (Providence, R. I., and Salem, Mass.).

A's pet aversion is a man who puts his foot on his chair. He says, "When I tilt my chair back and find a foot on the rung I feel like swearing, as I know I am hoodooed for that round anyway." B will not play with a man standing behind him

<sup>1</sup> Les Tricherres des Grecs dévoilés. Quoted from Steinmetz, *ibid.*, Vol. II, 253-259.

<sup>2</sup> Knowledge: Vol. I, p. 223.

<sup>3</sup> Current Superstitions, p. 79.

looking over his hand. C puts his stockings on wrong side out to bring him luck. Such cases as these might be multiplied indefinitely.

Rouge et Noir<sup>1</sup> gives the following superstitions common among gamblers: "To turn your back on the moon when playing for money portends ill luck; to lend money is unlucky; to play on borrowed money is unlucky; playing with money first laid on the altar Christmas night is lucky; some gamblers believe they can cheat luck by going from table to table, or playing at certain intervals. Beau Brummel believed that a crooked sixpence brought him luck and that, on losing it, his luck deserted him (Raikes Journal). In Germany the rhyme—

Lirurn, larum, broom sticks hot,  
Aged women eat a lot.

written on a piece of parchment and kept in the gambler's pocket, was supposed to enable him to win large quantities of gold. In 1897 little China or golden pigs were treasured as fetiches to bring luck. The approach or touch of a hunchback is held to be a sign of luck. In London about Throgmorton Street (the paradise of stock brokers), there used to sit a man with a bag of nuts into which passers by thrust a hand, and if they guessed correctly the number, they would be paid a penny for each, if wrong, the guesser paid a penny. Many a speculator regulated his 'bulling' and 'bearing' by his successful or unsuccessful dip into the bag." Rouge et Noir continues, by giving some of the superstitions of Chinese gamblers.

The forms which this belief takes—such as, for example, belief in seats, clothes, etc., may be largely accounted for by association. I lost two or three times when such a person was in the game; losing becomes associated with him. Further, a generalization is made on this basis from one or two particular cases. Prof. Jastrow in a very interesting paper shows, also, that many of the forms of belief, and of superstitious practice, have their basis in the crude form of reasoning by analogy;<sup>2</sup> the clover on account of its trefoil form, suggesting trinity, is good against witches; the ill luck of thirteen and Friday—being probably due to religious associations, etc. This only explains why certain things come to have a lucky significance attached. It does not explain the belief itself. Let us consider this larger problem.

Prof. Stewart Culin, in a most comprehensive study,<sup>3</sup> finds

<sup>1</sup> Gambling World, pp. 29-32.

<sup>2</sup> Fact and Fable in Psychology Ch. Natural History of Analogy, pp. 236-274. Boston and New York, 1900.

<sup>3</sup> Chess and Playing Cards—Catalogue of Games and Implements for Divination exhibited by Natural Museum in connection with Atlantic Exposition, 1895. Smithsonian Report, 1896, pp. 665-942.

that the implements of gambling of primitive man have their origin in methods of divination, and gives many cases where the same methods and implements are used, now for gambling, now for divination. The following abridged abstract from Prof. Tylor shows the same facts. He points out that divination by lot was a branch of savage philosophy of high rank; though with us it is a mere appeal to chance, it was not so with them. It was to no blind chance that appeal was made when Matthias was chosen by lot to become the twelfth apostle, or when the Moravian Brethren chose wives for their young men by lot, or the Maories when they threw lots to find who among them was the thief,<sup>1</sup> or the Guinea negroes' appeal to the bundle of little leather strips in the hands of the priest;<sup>2</sup> or the Greeks, the ancient Germans,<sup>3</sup> the ancient Italians<sup>4</sup>, or Modern Hindus when they left decisions, etc., to be determined by lot.<sup>5</sup>

"The uncivilized man thinks that lots or dice are adjusted in their fall with reference to the meaning he may choose to attach to it, and especially is he apt to suppose a spiritual being, standing over the diviner or gambler, shuffling the lots or turning up the dice to make them give their answers. This view held its place firmly in the Middle Ages, and later in history we still find games of chance looked on as results of supernatural operation." Thomas Gataker in a work "Of the Nature and Use of Lots" (1619), shows that this view prevailed at that time. Jeremy Taylor, forty years later, seems to give credence to the view.<sup>6</sup> Tylor points out the vitality of this notion of supernatural interference as illustrated in the still flourishing art of the gamblers magic and the folklore of the day. "Arts of divination and games of chance are so similar in principle that the very same instrument passes from one use to the other. . . . In the Tonga Islands the cocoanut is now spun to see if a sick person will recover, now spun for amusement.<sup>7</sup> In Samoa the spinning of the nut was formerly used as an art of divination to discover thieves, but now they only keep it as a way of casting lots and as a game of forfeits.<sup>8</sup> . . . The connection between gambling and divination is shown by more familiar instruments.<sup>9</sup> The huckle bones or astrali were used in divination in ancient Rome, being converted into rude dice by numbering the four sides, and even when the Roman gambler used the "tali" for gambling he would invoke a god or his mistress before the throw. . . . "The Chinese gamble by lots for cash and sweetmeats, whilst they also seriously take omens by solemn appeal to lots, kept in the temple, and professional diviners sit in the

<sup>1</sup> Polach: Vol. I, p. 220.

<sup>2</sup> Bosman: Guineese Kust Letters Eng. Trans. in Pinkerton, Vol. XVI, p. 399.

<sup>3</sup> Tacitus: Germania 10.

<sup>4</sup> Smith's Dic. of Gr. and Rome; art, oraculum, sortes.

<sup>5</sup> Roberts: Oriental Illustrations, p. 163.

<sup>6</sup> Jeremy Taylor: Ductor Dubitantium, in works, Vol. XIV, p. 337.

<sup>7</sup> Mariner: Tonga Islands, Vol. II, p. 239.

<sup>8</sup> Turner: Polynesia, p. 214; Williams, Fiji, Vol. I, p. 228. Compare Cranz, Grönland, p. 231.

<sup>9</sup> Cf. Smith's Dict., art, 'Talus.'



market place.<sup>1</sup> Playing cards are still used in Europe for divination. If it is a rule to be relied on that serious precedes the playful, then games of chance may be considered survivals in principle or detail from corresponding processes of magic,—as divination in sport made gambling in earnest."<sup>2</sup>

Space will not permit the writer to give here the mass of material that pertains to the belief in luck,—the lucky days, numbers, proverbs, the thousand and one charms and methods of avoiding bad, and bringing good luck. A volume has been written on the horseshoe alone. Suffice it to say that we have to do with a belief that was almost the guiding philosophy of action for centuries, and one that is not yet dead.

Miss Bergen has collected a volume of such beliefs still prevalent throughout the United States. She points out clearly that they are not merely 'survivals,' that these things only survive as long as endures that state of mind which originated them, that as thoughtless habit, such phenomena would not long persist, maintaining that her collection emphasizes the doctrine, that the essential elements of human nature continue to exist; and that "we can see the inclination has not disappeared, however checked by meditation or through complex experience, and however counteracted by the weight of later maxims. The examiner finds that he himself shares the mental state of the superstitious person."<sup>3</sup>

That the belief in luck still prevails was shown by a bit of recent Boston history—the "Lucky Box" craze of February, 1900—initiated by one Henry Parker. Large, conspicuous advertisements appeared for weeks in the daily papers—stating the wonderful powers of the lucky box, giving testimonials of those who had obtained marvellous success after having purchased one. It is estimated that Mr. Parker made seventy-five thousand dollars out of the scheme before his mail was stopped by the post office department, a period of three to five weeks. Though he had originally a plant, turning out a thousand boxes a day, he could not supply the demand. Twenty thousand letters addressed to Parker were held up at the Boston post office. An employee of a big transfer company said that he bought five boxes and enjoyed great luck. He said he knew a man who had won \$1,000,000 after he purchased a box.<sup>4</sup>

The following returns, received from college and normal school students, emphasize the same point.<sup>5</sup> In all, 423 answers

<sup>1</sup> Doolittle: Chinese, Vol. II, pp. 108, 285-7, 384; Bastiau, Oestl. Asien.

<sup>2</sup> Tylor: Primitive Culture, Vol. I, pp. 78-83.

<sup>3</sup> Current Superstitions, p. 5, of Introduction.

<sup>4</sup> Boston Herald, March 11, 1900, p. 8.

<sup>5</sup> Cf. Topical Syllabus, Question VI.

were received. Of these, 140 were cases of persons who considered themselves lucky by nature; there were 51 cases of persons who considered themselves unlucky; 31 cases of persons who imagined themselves lucky; 27 cases who imagined themselves unlucky. There were 116 cases in which the subjects stated that there were certain days when they felt they would be lucky, and 76 cases in which, Micawber-like, the persons believed something good was coming their way.

A typical case or so of the man lucky by nature is instructive:

(1) "I have an uncle who is lucky. He is of a jolly disposition, seldom worries, and is very risky. He was in the Carl's Rock Railroad disaster, where the train fell down an embankment sixty feet high, and he escaped. He was in the fearful fire in a Brooklyn theater where hundreds of lives were lost, and he escaped. In the Civil War, a shell passed so close to his head that it carried away a small piece of his scalp, but otherwise he was uninjured, while his chum was killed by the very same shell. He was thrown from the cab of a locomotive into the tender, in another railroad accident, and escaped with very slight injuries. He narrowly escaped walking into the elevator shaft of a ten story building. His life has been a constant round of narrow escapes, and he succeeds where nearly every one else fails in both business and social life." (2) "It does not matter what this man does it seems to result in his gain. He can pick up four-leaf clovers nearly anywhere, and has found money and jewelry. If anything is lost he seems to have the power to find it easily. When he goes out gunning he shoots more game than nearly any one else in the crowd. He can find game where others cannot. In business transactions he never makes bad bargains."

(3) "There is a man at home who is very lucky. He made a fortune in enterprises along the board walk. Every one speaks of him as the luckiest of men. In three distinct cases after he had sold out his share in certain buildings they have burned down."

(4) "There is a friend of mine, who to my knowledge, has been lucky every day of his life. In speculations of every kind he is always successful, everything he undertakes turns into money."

(5) "I know a man who trusts to fate continually, and he never comes to harm. I'd be afraid to act as he does. One day when the ice in the pond was very thin he walked across the stream, and when somebody told him he would be drowned he said, 'Well if you are born to be drowned you will never hang.' He got over all right, but I do not think anybody else could have done it."

This belief that luck is of an individual nature is one of its most significant features. Brand cites a large number of cases, showing how fortune attaches itself in a peculiar individual manner.<sup>1</sup> Tylor gives the following interesting account of this phase of belief:

"The doctrine of patron, guardian, or familiar spirits has held its permanence through all grades of animism. Their especial function is twofold. First, while a man's own proper soul serves him for the

<sup>1</sup> Brand: *Pop. Antiq.*, Vol. I, pp. 365-367; cf. also Dyer: *Folklore of Shakespeare Under 'Luck.'*

ordinary purposes of life and thought, there are times when powers and impressions out of the course of the mind's normal action, and words that seem spoken to him from without, messages of mysterious knowledge of council or warning, seem to indicate the intervention of, as it were, a second superior soul, a familiar demon; . . . second, while common expected events of daily life pass unnoticed as in the regular course of things, such events as seem to fall out with especial reference to an individual, demand an intervening agent.

"Such deliverances are accounted for in the lower culture by the action of the patron spirit of guardian genius. Among the Watchandi of Australia the spirit of the man first slain by another enters the body of the slayer and becomes his warning spirit.<sup>1</sup> That the most important act of the North American Indian's religion is to obtain his individual patron genius or deity, is well known. In Chili,<sup>2</sup> as to guardian spirits, it has been remarked that every Arancanian imagines that he has one in his service. In Africa,<sup>3</sup> the negro, and in Asia, the Mongol, has his guardian spirit. So also among the Aryan nations of Northern Europe and in Classic Greece and Rome, the doctrine may be traced.<sup>4</sup> In the Roman world the doctrine came to be accepted as a philosophy of human life. Each man had his "genius natalis"—associated with him from birth to death, influencing his action and fate. In early and mediæval Christendom this belief continued to prevail. Luther remarks that a prince must have a greater, stronger, wiser angel than a count, and a count, than a private man. Bishop Bull says: 'I cannot but judge it highly probable that every faithful man at least has his particular good genius or angel, appointed by God over him, as the guardian and guide of his life.'<sup>5</sup>

The following letter<sup>6</sup> from a man of culture who visited Monte Carlo (and who played only once for the experience) is of value, as it is a faithful introspective account of his feelings on this subject.

"And what was my experience? This chiefly—that I was distinctly conscious of partially attributing to some defect or stupidity in my own mind, every venture on an issue that proved a failure; that I groped about within me for something in me like an anticipation or warning (which of course was not to be found) of what the next event was to be, and generally hit upon some vague impulse in my own mind which determined me; that when I succeeded I raked up my gains, with a half impression that I had been a clever fellow, and had made a judicious stake, just as if I had really moved a skillful move at chess; and that when I failed, I thought to myself, 'Ah, I knew all the time I was going wrong in selecting that number, and yet I was fool enough to stick to it,' which was, of course, a pure illusion, for all that I did know the chance was even, or much more than even, against me. But this illusion followed me throughout. I had a sense of *deserving* success when I succeeded, or of having failed through my own willfulness, or wrong-headed caprice, when I failed. When,

<sup>1</sup> Oedfield: *Aborigines of Australia*. In *Trans. of Eth. Soc.*, Vol. III, p. 240.

<sup>2</sup> Molina: *Chili*, Vol. II, p. 86.

<sup>3</sup> Waitz: *Vol. III*, p. 182.

<sup>4</sup> Tyler gives many cases and references we are compelled to omit here.

<sup>5</sup> *Primitive Culture* (1888), Vol. II, pp. 199-204.

<sup>6</sup> Letter to the *Spectator*, Oct. 24, 1873, Saxon-les-Bains, "A Study in the Psychology of Gambling."

as not infrequently happened, I put a coin on the corner between four numbers, receiving eight times my stake, if any of the four numbers turned up, I was conscious of an honest glow of self-applause. I could see the same flickering impressions around me. One man, who was a great winner, evidently thought exceedingly well of his own sagacity of head, and others also, for they were very apt to follow his lead as to stakes, and looked upon him with a sort of temporary and provisional, though partially intellectual, respect. But what quite convinced me of the strength of this curious fallacy of the mind, was that when I heard that the youngest of my companions had actually come off a slight winner, having at the last moment retrieved his previous losses by putting his sole remaining two franc piece, out of the 125 francs he was willing to risk, on the number which represented his age, and gained in consequence thirty-two times his stake, my respect for his shrewdness distinctly rose, and I became sensible of obscure self-reproaches for not having made use of like arbitrary reasons for the selections of the various numbers on which I staked my money. It was true that there was no number high enough for that which would have represented my own age, so I could not have staked on that,—but then, why not have selected numbers whereon to stake that had some relation to my own life, the day of the month which gave me birth, or the number of the abode in which I work in town? Evidently, in spite of the clearest understanding of the chances of the game, the moral fallacy which attributes luck or ill luck to something of capacity and deficiency in the individual player, must be profoundly ingrained in us. I am convinced that the shadow of merit and demerit is thrown by the mind over multitudes of actions which have no possibility of wisdom or folly in them,—granted, of course, the folly in gambling at all,—as in the selection of the particular chance on which you win or lose. When you win at one time and lose at another the mind is almost unable to realize that there was no reason accessible to yourself why you won and why you lost. And so you invent what you know perfectly well to be a fiction—the conception of *some sort of inward divining rod* which guided you right, when you used it properly, and failed only because you did not attend adequately to its indications."

We have here two important factors, one—the very essence of the belief in luck—and especially that phase of the belief represented by guardian angels, etc.,—a semi-conscious feeling of a guiding power which gives one a cue to the result; second, we have an exaggerated feeling of one's own skill. Both of these are closely allied, both have their basis in a feeling of self-confidence, and both are common to men playing games of chance or entering on chance adventures. These inner feelings or premonitions are very strong in gamblers—the "hunch,"<sup>1</sup> as it is called and, like the inner voice of Socrates, it is followed most religiously.

Closely allied to this is the rôle played by the imagination. Prof. Lazarus says: "The particular seductiveness of luck, the sirens, who in winning or losing entice from stake to

<sup>1</sup> The term "hunch" is very common among gamblers, and the religious strictness with which this "hunch," or feeling in one of immediate coming success,—is followed,—is very significant.

stake, is 'die Phantasie.' The player hears in roulette the ball rolling, sees it fall and beholds himself a winner—"not as though it were a hope but as a living reality, does he perceive it with the inner eye and ear of the imagination." At first he puts no faith in the inner voice, but later he comes to believe in the phantom and wishes he had trusted in it.

The above facts, as well as those previously presented in the returns to the questioner, seem to point to one conclusion, viz., that one important element involved, is a strong passion for certainty, a longing for the firm conviction of assurance for safety. The uncertain state is desired and entered upon, but ever with the denouement focal in mind. In fact, so strong is the passion for the conviction of certainty that one is impelled again and again to enter upon the uncertain in order to put one's safety to the test. Thus, if successful, is the conviction of safety fostered and strengthened, and if unsuccessful, more prurient is the desire to try again to attain to success, and thus the general feeling of certitude, a little success tapping the whole hereditary reservoir in which the feeling of certitude lies latent. The feeling is thus out of proportion—either in success or failure to the stimulus. Thus, paradoxical as it may sound, gambling is a struggle for the certain and sure, *i. e.*, the feeling of certainty. It is not merely a desire for uncertainty.

We are here dealing with that same great passion for certitude which is the cornerstone of science, philosophy and religion—the desire to put the element of chance out of the game. We cannot do business with it. Take any game of chance, the player is pitted against a force which is different from a personal opponent. Here is a dark, inscrutable power which decides for or against him. As Lazarus says—the battle in chance games is not one of person against person, I against you; but now a new factor is present. This is *lawless chance* which determines the issue. There is no possibility of measuring the strength of the opponent; no means of estimating whether I will be a winner or loser.<sup>1</sup> It is because of this obscurity, because of the utter impossibility of prevision, that the player feels so utterly helpless before the unknown, in which there is no conception but that of chance as a deciding factor. On the side of chance is all the power and activity; on the side of the player all is impotence and passivity.

Such would be the condition of things when one acts in a game of chance or any chance environment, if there were no other psychic factors entering in to modify this. There is probably no case in which there are not other psychic factors,

<sup>1</sup> Lazarus: *ibid.*, pp. 73 ff.

else a man could scarce bring himself to the point of action. But the equalizing force, which always enters, is that of belief in luck or something akin. It is not blind chance which now decides, but there is a willing power. Lawlessness is put aside for fate, law or will. This is the very meaning of luck, the substitution of a conscious, determining force or will, for an indeterminable, precarious, headless chance,—law in place of lawlessness. The contest now becomes one between the players, each man's luck, against each other man's. It is not now a question of blind chance, but this—do you or I stand better with the deciding power, who wills? This, says Brinton, is the one feature underlying all religions—viz., that the great force of the world is a personal will.<sup>1</sup> This also is the feature which lies deepest in the gambler's consciousness. The attraction toward this dark, inscrutable power, plus a personal interest, is the background motive. One hopes by gripping the very ground of things to obtain the conviction of certitude. It so fascinates, one is impelled to experiment with it, test its relation to his own personality. It is a semi-unconscious desire—one ventures when he could not explain the reason. It is due to this same desire for a feeling of certitude that science, philosophy, religion, and all endeavor have derived one of their chief motives;—to fathom the fascinating unknown—to get the relief—the psychic “let down” from tension, a relief which the feeling of certainty always affords.

The significant fact, however, which the study of the gambler's consciousness, as well as that of men acting in uncertainty in general, impresses upon us is, that the feeling of certitude frequently exists even in a state of great uncertainty.

We see men having the same feeling of surety under the most precarious conditions. The conditions do not allow of prevision, but the subject feels and believes in himself, and in the favorable outcome of events, just as if prevision were possible. This conviction of safety, expressing itself in the more or less definite objective forms of luck, guardian angels, etc., is a definite biological product. Its effectiveness as a force in evolution in the increasing of action, is enormous. It is, we believe, an instinct-feeling as well defined as fear, its direct opposite, and like other similar psychoses, is a result of natural selection. We must remember that the state of doubt, bred by fear is ever and anon present in force—but still the opposite feeling holds its own, and must be in the ascendant at the moment of action. These two states so strongly counteracting each other are intermittent; now one is focal in consciousness, now the other. And this is precisely the economic value

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<sup>1</sup> Primitive Religions, Ch. I.

of these anthropomorphic forms of belief—as luck totems, ceremonies, and formulas—to hold the faith-state focal.

We will term this feeling—faith—as directly opposite to fear; using faith in a much larger sense than in its general religious connotation. It has its physiological concomitants—the increase of blood-flow and general vital feeling, and is the underpinning of all such states of consciousness—as those of the gambler who believes that he will win next time, of the lottery player that he will be the holder of the winning number, of the soldier that the other man will be shot, of each of us who believes that he is born under a lucky star; it accounts for those 'inner voices' which tell us to do this or that, and we will win, those voices which led men into the belief in guardian angels, etc.; it also accounts for the gamblers 'hunch,' those strange premonitions—"Do this" or "avoid that;" and the belief in a special guiding Providence.

It is more definite than what we in general term self-confidence. It is the feeling: I have a special tip, a cue in touch with the very ground principle, who wills. It is the natural result in a race which has been evolved in an environment where to succeed and survive ventures and risks were necessary, and where those who did survive had been successful in their risks. Let us consider this.

McGee<sup>1</sup> in a very interesting account takes the position of a two-sided cosmos among animals and primitive man—"the danger side in the van;—the safety side in the rear—with self as an all important center;" and speaking of primitive man he writes: "Only religious adherence to experience shaped instincts enabled his survival and permitted his tribe to increase." Further, he says: "Nearly all animals manifest a constant realization of three overshadowing factors in nature as they know it—factors expressed by danger, safety, self, or by death and life to self, or in general terms the *evil* of the largely unknown, and the *good* of the fully known,—co-ordinated in the vaguely defined subject of badness and goodness; and the chief social activities of animal mates and parents are exercised in gathering their kind into the brightness of the known and educating their native dread of all outer darkness. So, too, the more timid tribesmen . . . betray, in conduct and speech, a dominant intuition of a terrible unknown opposed through self to a small but kindly known. This intuition is not born of inter-tribal strife—it is merely the subjective reflection of implacable environment. . . . Over against this appalling evil, there is a less complete personified good, reflecting the small

<sup>1</sup> McGee, J. W.: American Anthropologist, Vol. I, No. 4, The Beginnings of Mathematics, pp. 646-674.



nucleus of confident knowledge with its far reaching penumbra of faith. . . . A vague yet persistent placement of the two sides is clearly displayed in the conduct of men and animals—the evil side is outward, the good side at the place or domicile of the individual, and especially of the group. . . . In general among the lower and more timid, the back stands for or toward the evil, the face toward the good, and among the higher and more aggressive, the face is set toward danger, *e. g.*; defensively birds and sheep, huddle with heads together, savages sleep with heads toward the fire, and timid tribesmen tattoo talismans on their backs, while litters of young carnivora lie facing in two or more directions, self-confident campers sleep with feet toward the fire, and higher soldiery think only of facing the foe."

The early development of self-confidence and faith no doubt began in some such conditions. Only through the exploiting of this terrible *unknown* could knowledge be acquired and advancement gained. It is thus clearly seen how all variations in men along the line of faith in self, feelings of safety in danger and uncertainty would be of the highest selective value. Men with such a characteristic would in consequence be inclined to take greater risks, and those of them that were successful would be much favored in survival through their newly acquired knowledge. Thus the exploiting type of man with great interest in the unknown, with a feeling of immuneness from harm, with a strong feeling of coming success, was developed. In its early manifestations this feeling of safety was propped and strengthened by its objectification in such anthropomorphic forms as are exemplified in the complex structure of beliefs in luck, favoring deities, guardian angels, etc. The value of this feeling of certitude in an environment of uncertainty cannot be overestimated. It is a biological device to procure from men the greatest amount of activity—a device which takes no account of the safety of the individual. Antipodal to this feeling is that of fear. The two are ever in conflict. Character is largely determined by the relative strength in the individual of each. Every game of chance, every risk which a man runs, is an interrogation of his feeling—a question put to the powers that be, whether or no such a feeling is warrantable. Do I stand in with the deciding will or no? Fear says "No." By being successful one gets a warrant, an assurance that he is lucky. Man will not believe that the deciding power is impartial to *him*. Who of us does not believe in his very soul, in the face of all evidence to the contrary, that *he* is "born under a lucky star?" It is one of the chief encouragements in life—this more or less vague feeling that a kindly fate is pulling our way. Each of us believes himself *sui generis* and that

the mighty will behind things is especially behind *him*. To men entering upon great enterprises such a feeling is indispensable. It made a Napoleon—the child of destiny—possible to the world. It also gave the Christian world its Christ.

Montesquieu and Diderot both were of the opinion that the gratifying self-reliance in the feeling that I am a special favorite of fortune, was the one particular motive of hazard plays.<sup>1</sup> For one who does not believe in blind chance, a pure game of chance, or any risk, is the purest form of obtaining an expression from the guiding power, or favor or disfavor. A phenomenon closely allied is the desire to have one's fortune told. It is a very indefinite notion of somehow getting a clue to how I stand in relation to the universal mechanism. This is the central problem in an environment of uncertainty.

Thus we see how closely the gambling impulse approximates the philosophical and religious motive. With the savage, as we have seen, gambling and religion are almost identical. The one chief incentive to the savage for gambling is to see how he stands with his favoring or disfavoring deities. The very implements he uses are developments from divinatory implements and often the same devices are used, now in divination, now in gambling. In deciding any specific case as to whether he will go to war, or as to which direction he shall proceed to forage for food, he trusts to the answer from his deities, as given by the fall of his divinatory implements. Has a theft been committed, his deities reveal the guilty man through the same means. In all fortuitous circumstances he trusts implicitly to these same divinatory means. And with these he gambles in his time of recreation. Is it not clear why gambling is of the most serious moment to him? Now he is not seeking encouragement or direction in a specific case but in a general case. He feels that the fall of these implements, directly guided by the deity, is pregnant with meaning respecting his general status with that being. Thus it is the savage is so desperate a gambler, regarding his whole fortune, aye, even his wives and children as insignificant in comparison with this decision for or against him. So also in a less intense degree is it with the modern believer in luck. This explains much of the almost inaccountable states of emotional frenzy gamblers display, and their tenacity in play.

Lucky or unlucky, that is the paramount issue with them both. No matter how much a man may understand of the calculus of probabilities, when he sits in the game, like the observer above quoted, he feels somehow he has in him a divining rod pointing the way to success if only he would be guided. The

<sup>1</sup> Lazarus: *ibid.*, pp. 72, 73.

step to absolute superstition is a short and easy one. Men need sorely the assurance of their being a vital part in the universal economy. Hence the unfailing interest in the transcendent. The philosopher seeks by reason to get a grip on the ground principle; the religious man seeks it by faith; the gambler, by faith strengthened by the favoring fall of the die.

Significant in this connection is the fact that there seems to be a correlation between the extensity and intensity of the gambling passion and the religious life of certain races. Prof. Lazarus, remarking on this, says: "That race which shows the deepest religious development of all races up to the present, that has built up and developed the richest and most sincere spiritual life, the Teutonic, showed in earliest times a passionate inclination toward chance plays. . . . The property, so clearly conspicuous in the course of the history of the Teutonic peoples for the transcendent, the abstract, and idealistic, shows itself also in the inclination toward those plays in which the idea of fate in dark form and figure is represented. Stern moralists might object to see the highest ideas placed in connection with immoral plays themselves; but psychological facts must be investigated without prejudice where it has to do with tracing back a historically believed universal property in the innate character of a folk spirit."<sup>1</sup>

To realize the enormous rôle which this factor that we have termed faith, *i. e.*, the feeling of safety under circumstances of great uncertainty and risk, has played in the development of civilizations, a glance at one or two significant cases in history is necessary. The Jews in an environment of uncertainty, *i. e.*, wandering in the desert—with this feeling as a basis—created that system of monotheism, which has been adopted by the whole Christian world. As the gambler must have the conviction of safety in his staking in games of chance, and so, on this feeling of faith as a basis, creates the objective forms of luck, etc., so the Jew under the same stress created the most effective of all confidence producing agents—one omnipotent God—who *especially favored him*. In each case the principle is the same—that biological factor selected in the race—to instill confidence in the face of danger, that device to put chance out of the game. So wherever we find men acting under circumstances of great risk, we find this feeling asserting itself. Also it is where this conviction of immunity from danger is especially strong that we find races and individuals of the exploiting type. The Romans had it to an extraordinary degree. And as Tyler says: "In the Roman world the doctrine of guardian angels came to be accepted as a philosophy of human life.

<sup>1</sup>*Ibid.*, pp. 79, 80.

Each man had his 'genius natalis'—associated with him from birth to death—influencing his action and fate." We have here the backbone of individualism and optimism.

Just as this state of mind was strong in the Jew and Roman—the two great exploiting individualistic races of the ancient world—so it is one of the chief factors in the Anglo-Saxon mind. As a prop to this feeling of certainty and safety, he also has his religion. The Anglo-Saxon race believes as firmly that it is the favored people of the one great God, as the Jew did two thousand years ago. And each individual believes that *he* is especially favored. His faith in his own ultimate safety and good fortune, is something stupendous. If a great gambling enterprise, as in the case of the Philippine Islands, presents itself—a whole nation cries "Manifest Destiny," and nearly every preacher in the land proclaims it to be the will of God. The gambler's faith in his luck—his constant belief that next time he will win, is but a fact similar to this.

It must be remembered, however, that though in every case the religion seems to give man this faith—it is the feeling of faith, this conviction of safety and certainty, which gave rise to this particular form of religious belief. On our thesis this feeling is one which has been selected in the course of evolution as a necessary factor in an environment of risk and uncertainty. It may have no objectification in religious or superstitious forms at all. In the case of men of genius this is often exemplified—as seen in the man who perceives a work to be done, precarious and uncertain in its outcome, yet who in his soul feels he is the man to accomplish that work and has little fear or doubt. This, says Pres. G. Stanley Hall, is the essence of genius. At root it is the same feeling or conviction of safety and certainty, as gave rise to such beliefs as luck, guardian spirits, and a special Providence. The only difference is that the man does not necessarily account for it by attributing its source to something external to himself, though often this is true as in case of Napoleon, "the child of destiny." From this standpoint we may expect a race in whom a large part of what we now call religious belief and motive, will be identical with normal life motives.

This factor of faith in self safety is often of a deleterious influence in cases of abnormal optimism where the individual trusts entirely to luck and not at all to his own effort. It is only too true that favorable chance is the goddess of the idle, the criminal and the desperate. On the other hand, this element of faith has additional value in that it places all the favorable things that happen to a man in italics. A horseshoe hung over your door is equivalent to underscoring everything fortunate which happens to you. The man who believes that

he is lucky selects and isolates the happy things which happen to him. Further, the belief that you will succeed in an uncertain and difficult undertaking is often half the battle.

#### CONCLUSION.

In the preceding we have attempted to study the psychic attitude and reaction of man in the face of one of the great conditioning factors in life—that of chance and risk. Study shows two opposite feelings arising, fear and faith, *i. e.*, a fluctuating feeling of certitude. The one tends to make man withdraw or at least remain inactive; the other to throw aside the idea of a blind chance and to replace it by one of law or order, *i. e.*, a favoring will, and in consequence leads to taking risks and, in general, increased activity. In gambling this latter feeling expresses itself predominantly, as in this play the faith type of man is selected. His belief in his immunity from harm, in his final success, is his most marked characteristic. This feeling of certitude is the great biological organ which functions to suppress the idea of chance and to minimize the respect for the danger in risk. It is closely in touch with the philosophical question which is the paramount issue of every life—"How do I stand in relation to the deciding will?" It is not surprising that this factor should be central in that great species of adult play which we have attempted to analyze in this study.

(2) The preceding study also suggests that an environment of uncertain content may be necessary to the human species, inasmuch as it has been evolved therein; that it is an essential condition to give that state of suspense which is the ideal condition of all forms of pursuit. This need of tension, together with the feeling of faith in one's safety, is perhaps one of the most effective of all agents reacting against the great psychic tendency toward fixity, a tendency which expresses itself in the formation of habits, and in the accepting of absolute standards,—the natural end being arrest of development.

(3) A third point worthy of emphasis is the emotional intensity incident to gambling—arising from the presence of many of the strongest egoistic instinctive feelings. We find that this is one of the chief incentives to gamble. To seek intense states of consciousness seems, as many writers have pointed out, a normal tendency. This tendency, which seems on the increase, may be of high selective value. The influence of intense emotional states on the bodily metabolism is now well recognized. The Indians realized their therapeutic value when, in cases of sickness, large gambling parties were assembled in which all present became intensely excited, often nearly wild. To these conventions the sick were brought. This is very suggestive. The race has probably nearly reached its

limit in evolution along anatomical development. But physiologically, the possibilities are unbounded. May it not be that this increasing tendency to seek emotional states is an attempt, through natural selection, to put man on a higher metabolic level. The psychology of excess of all kinds becomes a large problem in this light.

It is significant to note that we find gambling very prevalent in the early formative periods of society, and in newly exploited countries. Under these circumstances, the will to live increases with the increase of danger and uncertainty. Hence, intense emotional states which increase the feeling of the reality of self as well as the bodily metabolism—are sought. This, together with the exercise of the feelings of hope and faith in self that gambling affords, makes it in early states of society attractive. So in later periods gambling is indulged in as an outlet, a channelization of the pent up biological forces which a narrow specialized life does not afford. Man's biological heredity in the manifold form of various egoistic impulses cannot be ignored. They demand expression. There is, so to speak, a katabolic imperative. This outlet gambling furnishes in that it so well simulates the environment of primitive man. Again, a man in a narrow specialty feels his restrictions. He may be making needles and feel that he can make a machine. But give him strong emotional excitation, which increases the entire bodily metabolism, and he is on the metabolic level that he would be on were he making machines. He has all the enthusiasm and feeling of genius for the moment, though he may not be doing the work. Such results, gambling excitations, alcoholic intoxications, and the like produce. The problem is how to give normal emotional channelization, the safety valve of this biological heredity.

(4) The study of the gambling impulse further emphasizes the fact that man easily gives up the intellectual for the instinctive life; that he has not learned, as well as many writers would have us believe, the lesson of work and the power of sustained voluntary attention. This has been considered one of the great achievements of civilization. One of the chief motives for gambling, as we have seen above, is to obtain the rewards of labor without laboring. This is one of its chief pleasures, to have acquired a dollar without sustained toil. It is also worthy of note that often the gambler expends as much energy in obtaining his dollar as if he labored for it. In the one case, however, the attention is spontaneous, in the other voluntary.

(5) In the light of this investigation a few words in regard to theories of play may be instructive. It is a fair question whether plays of adults must be put under a different category



from plays of children. Let us take a retrospect. We have been dealing with a form of play found among all peoples. The following points are most significant: (1) Gambling has for one of its chief motives the acquisition of property—in other words, power. (2) Gambling calls forth some of the deepest of human instincts. It is a courting of fear—fear with which you must trifle, if, as it has been so well expressed, you wish to taste the intensest joys of living. So, also, it is the seeking after feelings of faith in self-safety in the face of danger—a play upon the hereditary orchestration of success in the race; a feeling which is our legacy in being the progeny of the survivors and the fit in the struggle for existence. So also, as we have seen, gambling raises into consciousness many egoistic instinct-feelings,—as the desire to dominate and humiliate your fellow, the love of conflict—your courage and power against mine, the satisfaction of being the object of jealousy, the pleasures derived from the exercise of cunning, deceit and concealment. (3) Gambling also excites the deepest of all interests in life—that in the transcendent, the dark obscure beyond. This, together with the general uncertainty of the environment, together with the fluctuations between faith and in self and ever recurring fear—plus the ever present seeking for material gain—gives that tension which to many is the very definition of life.

Can you find a half dozen deeper things in man than these, which form the very nucleus of this great play? It is, indeed, a simulation of life feelings. But of life in which all pity and sympathy for man is absent; in which self is the all important center; in which to gain, to fight and to feel God is with you, are all in all; in which each of these is intensified and exaggerated. Neither the theory of play set forth by Spencer nor that of Gross, nor any of the theories of play the writer has met, wholly satisfies these conditions. We meet here with an expression of instinct centers which no doubt are highly anabolic. But it is not necessarily a case of surplus energy in the organism which is the meaning of Spencer as I understand it. If these psychic phenomena be latent in some organic condition, and their manifestations depend on the cells of these organic centers being in an anabolic state, may it not be that those centers which are oldest, acquired first in the process of evolution, are first objects of nutrition, and that each organic center receives energy according to its priority of age, especially if for a long period it was required to function actively in the preservation of the species. Thus it might result, where the supply of energy was at any time insufficient for the whole organism, that these oldest organic centers would be nourished, while variations acquired later



would not, even though these might be of more value at the time in fitting the organism for survival. One answers immediately that those old organic conditions, having ceased to be of value and having become rudimentary organs, are finally sloughed off. But is this the case in the psychic realm? Is it not true that organs only become rudimentary through disuse? Do psychic centers ever cease to function actively? Do not old instincts—though of no value at present—still receive exercise by thrusting themselves at every possible opportunity into activity—especially in moments of recreation—determining thus, as I have mentioned, the forms and nature of play? At least it is clear, that this being the case, they tend to become rudimentary much less than is the case with other organs of the body. Even with these latter, may it not be that organs, such, for example, as the tail of the monkey, long resisted degeneration because, even after the establishment of the monkey in the terrestrial environment, the tail was used to swing the monkey in moments of recreation. Certain it is, there is a glow of satisfaction in using these once valuable organs. So in the psychic realm even though these instinct centers may in time become rudimentary, is it not at least clear that they resist degeneration a long time by thus expressing themselves in forms of play in moments of recreation? In the light of these considerations play, especially adult play, becomes a subject of not a little sociological and ethical importance. Thus in play, for a long time at least, a race would revive its psychic past, having created the stimuli prevalent in the primitive environment. Play would thus be an index to the history of the psychic life—a kind of historico-anthropological theater.

(6) As to the contribution of this study to the subject of ethics, it seems to the writer there is much which speaks for itself. Conduct is the result of latent biological forces; much conduct, being the forced expression of highly anabolic instinctive centers which have functioned through long previous periods in preserving the species. These resist for a long time degeneration, do not tend readily to become rudimentary, and hence are ever on the threshold of activity. Prohibition is impossible. If this activity is a menace to our present social conditions, substitutions must be offered. In other words these instinct-activities must be channelized into harmless courses. To accomplish this there is necessary a thorough study of these instincts in their biological and genetic origins. This gives us a hint of what ethics and also sociology may gain by leaning on their natural supporter—psychology.

## THE HABITS OF FISHES.<sup>1</sup>

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### INTRODUCTION.

In reading Darwin's *Expression of Emotions* one becomes impressed with the idea that while for the special purpose to which that work relates, it suffices to say that certain movements are the direct outcome of the constitution of the nervous system, for the broader purposes of evolutionary neurology the real question is: How did the nervous system come to be such as it is; that is, how has it come about that there has been developed just that series of nerve mechanisms which corresponds to the demands made upon the organism by its environment? It is not enough to say that it has arisen through natural selection unless we can, without violating scientific probability, show in some precise and detailed way how the necessary gradations could have arisen and been selected. Instead of looking around for a god-send in the way of "spontaneous" variations we would, as Eimer insists, better look to physiological laws for the basis materials upon which natural selection can work. To this end the tracing of the steps by which, in the fishes, from a comparatively simple instinct, a comparatively complex instinct with various accessory instincts, has arisen, cannot be without value; for it shows how a progressive change of conditions in the environment has originated a definite correlative change of function in the organism. And the paucity of cases in which such a definite correlation is demonstrable, renders every one valuable.

In the study of animal psychology one method especially offers a chance which should not be neglected, namely the comparative method. Careful observation and comparison from species to species of a genus, from genus to genus of a family, and from area to area (geographical distribution), may be ex-

<sup>1</sup>This paper embodies conclusions formed in part during five years of work in the U. S. Fish Commission, and in part as the result of a collection and comparison of all data upon the habits of fishes in the first two Reports of the Commission, made while at Clark University. I here extend thanks to Prof. B. Warren Evermann and Dr. Fritz Schwyzer for their kindness in criticising manuscript, and to Dr. W. C. Kendall for furnishing data.

pected to give some clue to relative antiquity of instincts; the oldest instincts, like the oldest structures, being (in general and subject to more or less qualification) those in which the most species of a genus, genera of a family, etc., agree; and the most recent being those in which the species, genera, etc., differ the most.<sup>1</sup> The present method of studying the psychic development of the young is, of course, excellent. But just as comparative anatomy preceded embryology, so here, as a preliminary, the comparative may prove more profitable than the developmental psycho-physiology.

For the evolutionary physiologist the most important task is the locating of the cardinal points of the spiral life curve, that is, the division of the life cycle into its separate terms, the analysis of their interdependence, and the determination of their order of sequence *and the conditions which determine that order*. In the fishes the determination of these cardinal points is, fortunately, not difficult. They here mark the periodically recurring instincts of migration and reproduction. And just as we find Ryder<sup>2</sup> implying that repetition of structure is conditioned upon repetition in embryonic environment, so here we can assert that cyclical recurrence of instinct is the outcome of cyclical recurrence of environmental stimuli.

Considering that on account of their economic importance, we have a fuller and more accurate knowledge of the habits of fishes than of those of other animals, it is surprising that up to the present there has been no attempt at a connected and systematic presentation. Except for a few paragraphs in Darwin and a few pages in Romanes, there is practically no literature apart from numerous scattered notes, mostly in the Reports of the various Fish Commissions and Fish Cultural Societies. The present paper is merely an attempt to bring order out of chaos.

The conclusions arrived at are: (1) the significant fact in the temperature relations of fishes is the distribution of spawning with reference to the signs of the temperature zodiac; (2) the cause of spawning is the definite temperature trend in *one* direction; (3) structurally similar forms tend strongly to sustain in their spawning similar relations to the temperature curve; (4) in at least some cases apparent exceptions can be harmonized with the law; (5) for a given species the temperature relations which determine its migration and probably also its geographical distribution, are the same as those which determine its spawning; (6) these facts demonstrate the presence of a temperature responsive nerve mechanism; (7) this mechanism is a character

<sup>1</sup> No one will suppose that this is regarded as a new method. In Comparative Psychology, however, it has not been utilized to any extent.

<sup>2</sup> Woods Holl Lectures for 1894, 1895, pp. 23-55.

of prime importance and is entitled to at least super-Family rank; (8) the existence of this mechanism explains *why* with in-cooling spawning<sup>1</sup> is, and *must be*, associated to-cooler<sup>1</sup> migration and boreal distribution, and with in-warming spawning, to-warmer migration and austral distribution; (9) by a working backwards from the time of most successful hatching, the time of spawning has been determined via natural selection; and (10) the time of spawning being so fixed, by a further working backward, natural selection has determined the time of precedent migration.

#### SPAWNING HABITS.

1. *The significant fact in the temperature relations of fishes is the distribution of spawning with reference to the signs of the temperature zodiac.*

As to the temperature relations of spawning, it must first be noted that it is nearly all concentrated into two fairly distinct periods, a fall period from about September 1 to freezing (November), and a spring period from thawing (March) to about July 1. It is not contended that these limits are exact. Some fall spawning begins late in August, or even a little earlier in high latitudes and altitudes, and a somewhat larger amount lasts into December, but this is merely delayed fall spawning. The very purpose of this paper, however, is to insist upon the fact that the determinant is *not* the calendar, but a given temperature *taken in connection with the direction of temperature trend*. Mere contact with water of a given temperature cannot alone be the cause of spawning, for in the nature of things such contact occurs twice every year, once on warming water and once on cooling water, while spawning occurs but once. Though perhaps not entirely new, this relation needs to be emphasized and may be thus formulated: *As regards spawning, fresh water (and probably all other) fishes fall into two groups, those which spawn in warming water and those which spawn in cooling water.*

2. *The cause<sup>2</sup> of spawning is the definite temperature trend in one direction.*

With marine fishes our knowledge is least certain for those species which, like the cod, spawn eggs which rise to the surface ("floating" eggs). But everything we do know tends to show that with them, too, water temperature is the cause of spawning; for they spawn within fairly close time limits, and spawning is retarded or advanced by unusual fluctuations of temperature from the average, just as is the case with the beach

<sup>1</sup> In-cooling spawning: Spawning in cooling water. To-cooler migrating: Migrating from warmer water to cooler.

<sup>2</sup> Or, better, the environmental factor, the immediate stimulus.

spawners and the anadromes,<sup>1</sup> where our knowledge is more complete.

The rule certainly holds for the ocean bottom spawners. Thus, to take a single instance, the movements of the Norwegian herring (which spawns in warming water) to its spawning grounds depend on temperature, most being caught on the spawning beds between 12 and 14° C., cold weather diminishes the yield of the fisheries, the higher the temperature the deeper the spawning grounds, and the Dutch fishermen set their nets by the thermometer.

With both beach spawners and anadromes, in the case of those species ripening in warming water, spawning takes place in a regular progression from south to north. Occasional accordant exceptions occur. For an actual example, an in-warming-spawning species is known to spawn earlier in the northern of two closely approximated streams that stream being from local causes the warmer. Further, the regular progression across the parallels of latitude finds its counterpart in an equally regular progression with increasing altitude. Moreover, spawning takes place earlier in warm seasons, and later in cold ones. With shad the proportion of ripe females taken early in the season, to the whole number of ripe females caught, is greater in warm seasons, and then ripe females are scarcer later in the season. The exact reverse holds for those species which ripen in cooling water, an equally regular progression occurring from north to south and from high altitudes to low. In cold seasons spawning takes place earlier, in warm seasons later, and it occurs earlier in the colder of two otherwise similar and closely approximated streams. Finally, there is actually observed with both classes of fish, a thorough correspondence, increment for increment, between progressive approximation in water temperature to the spawning point, and progressive approximation in the reproductive organs to full ripeness.

3. *Structurally similar forms tend strongly to sustain similar relations to the temperature curve, that is, to spawn either all on its ascending or all on its descending limb.*

This subject cannot be here treated in extenso but it may be mentioned that all the minnows (Cyprinidæ), the catfishes (Siluridæ), and the sunfishes (Centrarchidæ), spawn in warming water, while among fishes spawning in cooling water are all the cods (Gadidæ), and also probably all the Salmonids. The last will now receive more extended discussion. The following is a list of the native American species with their spawning times :

<sup>1</sup> Anadromes: Fish ascending rivers annually to spawn.

		In cooling water.	In warming water.
Whitefishes ( <i>Coregonus</i> ); 8 species,	Late fall	x	
Atlantic Salmon ( <i>Salmo salar</i> ),	" "	x	
Sebago Lake Trout ( <i>Salmo salar</i> <i>sebago</i> ),	" "	x	
Columbia River Trout ( <i>Salmo</i> <i>mykiss Clarkii</i> ),	Spring		?
Yellowstone or Cut-Throat Trout ( <i>Salmo mykiss Lewisii</i> ),	"		?
Utah Lake Trout ( <i>Salmo mykiss</i> <i>virginalis</i> ),	"		?
Steelhead ( <i>Salmo Gairdneri</i> ),	Feb.-May		?
Rainbow Trout ( <i>Salmo irideus</i> ),	Nov.-May <sup>1</sup>	x	
Brook or Speckled Trout ( <i>Salvelinus fontinalis</i> ),	Late fall	x	
Greenland Charr ( <i>Salvelinus alpinus stagnalis</i> ),	" "	x	
Dolly Varden Trout ( <i>Salvelinus Parkii</i> ),	" "	x	
Chinook (or Quinnot) Salmon ( <i>Oncorhynchus tshawytscha</i> ),	July-Dec. <sup>2</sup>	x	
Blueback Salmon ( <i>Oncorhynchus nerka</i> ),	Aug.-Nov.	x	
Humpback Salmon ( <i>Oncorhynchus gorbuscha</i> ),	Aug.	x	
Dog Salmon ( <i>Oncorhynchus keta</i> ),	Sept. or somewhat earlier	x	
Silver Salmon ( <i>Oncorhynchus kisutch</i> ),	Late fall, early winter	x	
Great Lake Trout ( <i>Cristivomer namaycush</i> ),	Sept.-Dec.	x	
Grayling ( <i>Thymallus signifer</i> ),	April		?

From this list it appears that as a whole the Salmonids are fall spawners, that is unquestionably spawners in cooling water; but a few species are aberrant in this respect and this brings us to our next consideration.

4. *In at least some cases apparent exceptions can be harmonized with the law.*

Before taking up this proposition, however, one current but erroneous idea must be corrected. In so far as it has been alluded to at all, it seems to have been tacitly assumed that spring spawning *must* mean spawning in warm water. So unquestioningly has this been assumed that there are few thermometric data to which to appeal. It is, however, demonstrable

<sup>1</sup> See below.

<sup>2</sup> July only in high altitudes.

that at least it may be, and it is quite probable that in some cases it is, associated (via a temperature induced migration) with the exact opposite, viz., spawning in cooling water. As examples of the latter may be cited passage from the bottom water of a lake at maximum density temperature ( $4^{\circ}$  C.) into tributaries just thawing (that is, approximating to  $0^{\circ}$  C.), and passage a little later in the season from a warming lake or ocean into snow fed streams. The assumption that spring spawning necessarily means spawning in warming water, is then entirely unwarranted.

Now for the explanation of the aberrancies. The American Salmonids which exhibit the anomaly of spring spawning are:

*Salmo mykiss* (3 varieties).

*Salmo Gairdneri*.

*Salmo irideus*.

First, as regards the interrelation of the species. Jordan and Evermann think *Salmo Gairdneri* nothing but *S. irideus* which has descended to sea and returned, and Gilbert and Evermann know no way of distinguishing the young of the two species. Whence it is at least possible that the three exceptions are in reality but two.<sup>1</sup> Second, in all these forms the spring spawning either ensues upon migration into, or takes place in mountain (and mostly, if not entirely, ice-fed) streams which, as has been shown, do not necessarily warm with the advancing season, the ice or snow only melting the faster. Third, in the case of *S. irideus* we are not confined to presumptions. In the McCloud River, California, it spawns from January 1 to May, but that this is *not* spawning on warming water is shown conclusively by the fact that when brought from the McCloud to the Wytheville, Virginia, hatchery, it shifted its spawning time *not forward to spring but backward to fall*, and spawned from November to March. The inferences are that at Wytheville a temperature is reached in November which is not reached in the McCloud until January, and that the McCloud is about the southernmost point in the distribution of the species, because farther south the temperature in winter does not sink to the spawning point. The large salmon of the Danube (*Hucho hucho*) runs up the tributaries of that river from March to May to spawn. In the absence of data and considering the similar migration, it is not unreasonable to suppose that this species, and also the graylings which spawn under similar conditions of migration, may conform to the rule.

<sup>1</sup> The case stood thus when the above was written in 1895. In the latest authoritative pronouncement (Jordan & Evermann, 1896, Bull. U. S. Nat. Mus., XLVII, pp. 488-500) all three species are recognized, but apparently as foci around which a number of variations group themselves, and intermediate varieties are referred to.



5. *For a given species the temperature relations which determine its migration, and perhaps also its geographical distribution, are the same as those which determine its spawning.*

Under Migration Habits it will be shown that those species which are stimulated to spawn by warming water are equally stimulated to migrate by warming water, and *vice versa* for forms stimulated to spawn by cooling water, subject only for the Salmonids, to the (probably only apparent) exceptions already discussed. It remains here only to point out that those forms which spawn in warming water are all austral forms, whereas those which spawn in cooling water are all boreal forms. Both of these classes meet in the temperate zone, but it seems a fair inference that their range, northward in the one case and southward in the other, is checked at the limits where their respective spawning temperatures disappear; that is, the austral forms cannot range farther north than the place at which the highest summer water temperature reaches the spawning point, or the boreal forms farther south than the place where, at the lowest winter temperature, the water cools to their spawning point. At least the high altitudes which mark the southernmost limits of the ranges of the rainbow and the Yellowstone trouts, speak for this view.

6. *These facts demonstrate the presence of a temperature-responsive nerve mechanism.*

The word "demonstrate" is used advisedly, for it would be literally inconceivable (that is, opposed to all biological analogy whatever) that such a progressive development of the reproductive organs, extending over months, should be independent of nervous control. Any objection based on the lack of actual anatomical demonstration of the mechanism, would prove equally well that the mammary development of pregnancy is independent of nervous control. Consisting of more than one neurone (a nerve cell plus its fiber), the utero-mammary reflex arc cannot be demonstrated anatomically, that is, by the usual degeneration methods. Still its existence *must* be conceded throughout the whole mammalian class; and as it is not known outside that class, it becomes just as important a taxonomic feature as the uterus or mammae, for, like them, it persists over equally wide groups, areas and times. As biological philosophers, therefore, it behooves us to remember that besides the convenient, naked eye anatomical characters utilized for classification, a number of physiological characters exist which are perhaps less immediately evident, but which are none the less real and important.

7. *This mechanism is a character of prime importance and is entitled to at least super-Family rank,*

For it plays the dominant roll in the fish's life. Just as much

as, if not indeed more than, the Salmonidæ are fishes with abdominal ventral fins, two dorsal fins (an anterior rayed, a posterior adipose), scaly bodies without barbels or spines, with distinct maxillaries, naked head, ctenoid scales and siphonal stomach with many pyloric cæca, are they fishes which (on the whole and small fluctuations in the life cycle perhaps apart,) *tend to seek cooler water*. Indeed, this is their fundamental dynamic character, the character which is back of their migrations and habitats, which latter have, in turn, developed their generic and specific differences. In every element by which we rate the taxonomic value of biologic characters, namely persistence over wide groups, areas and times, this nerve mechanism (demonstrated by its effects) must be accorded high biologic rank. For though the Salmonids have been able to change almost everything else (habitat, mode of life, feeding habits, etc.) and coincidentally have varied through species and genera into families, there is not at present a proved instance of any species having varied to spawning in warming water. Indeed there would seem good reason for believing that they could not possibly so vary, for a change by an abrupt shift-over would manifestly be impossible, and slow variations toward such a change could only consist in a shifting of the spawning time toward a warming water season, a shifting which, as shown on p. 416, would necessarily be eliminated through natural selection.

It must be accorded at least super-Family rank inasmuch as both the Argentiniidæ (capelin and smelt family), and the Salmonidæ (salmon family proper) in all its genera and species as far as at present known, agree in possessing it. That is, it antedates their divergence and, if the considerations urged on p. 420 have any force, it certainly antedates the present streams, since when the anadromous Salmonids were beach spawners it already dominated their to-beach migrations.

8. *The existence of this mechanism explains why with in-cooling spawning is, and must be, associated to-cooler migration and boreal distribution, and with in-warming spawning, to-warmer migration and austral distribution.*

No species could be at once in-cooling spawning and to-warmer migrating, because it would constantly migrate away from the only waters capable of developing the reproductive organs. Further, were such a combination possible, we should find at least some in-cooling spawning species with an austral distribution, but we do not. When, however, we once admit the necessity of the co-existence of in-cooling spawning with to-cooler migration, as two phases of action of the same nerve mechanism, we at once see *why* in-cooling spawning and to-cooler migrating species must have boreal distribution. For they will constantly be fended off from the warmer southern waters both

by repulsion of contact and by the inability of finding there water cool enough to develop the reproductive organs. *Mutatis mutandis*, we have a similar explanation for the actual association of in-warming spawning with to-warmer migration and austral distribution.

If it is urged that *a priori* we might conceive of cyclical variations (between, merely by way of example, a summer to-warming and a winter to-cooling impulse or, *vice versa*) it can only be said that though the possibility is not to be denied, no such actual case is known.

9. *By a working backward from the time of most successful hatching, the time of spawning has been determined via natural selection.*

Though the conditions are such that general reasoning can hardly be gainsaid, probably the best proof of this principle is the following actual case. In the early days of fish culture Mr. N. W. Clark hatched whitefish eggs in spring water at 47° F. with the result that hatching took place too early, all attempts at artificial feeding failed, and the fry starved to death. Next year he used the same spring water, merely interposing a cooling ice pond, and 50% were successfully hatched, beginning about April 1.

The whole subject being epitomized in this case excessive elaboration of argument is unnecessary. The fry must not hatch too early or they will starve, their food not hatching out until about March or April. If they must not hatch too early the eggs must not be deposited too early, and those fish which spawn too early will leave no descendants to perpetuate their over-readiness.

Equally they must not be deposited too late. Here, however, the environmental conditions are not so exacting, and accordingly we find that with most of the late fall spawners the end of the spawning season is not so sharply defined and tends to fray out into the winter. At the beginning of the season the water is comparatively warm and each day involves a disproportionate amount of development, but as temperature lowers each day possesses a constantly decreasing incubation value.<sup>1</sup> A few days too late, therefore, has no such potent effect as a few days too early. Besides, a delay of a week at 33-35° F. in spawning will be made up rather quickly as the water warms in spring, every day then doing as much as several in winter.

<sup>1</sup>The rule of 50 days at 50° F. and 5 days more or less for every degree lower or higher, holds fairly well for many of the Salmonids. Attention is directed to the very great variation in time for a small variation in temperature. Thus compare 50 with 45 and 35. At 50 each day represents 1/50 of the development, while at 45 it represents only 1/75, and at 35 only 1/125 of the whole development.

That this reasoning is correct may be inferred from the comparatively few cases of fall spawners whose eggs hatch before winter. With the Chinook Salmon, for example, the limit of the end of the season is almost as sharp as the beginning. Unlike the later spawners which, stimulated to spawn when a certain point is reached, continue to be stimulated for a number of degrees below (that is, the stimulus does not press simultaneously and with irresistible force on all individuals alike), the vast majority of the Chinook Salmon spawn within a short time (about two weeks, at any one place). And why? Because their eggs hatch in about 35 days and the fry must be out and sufficiently developed in time to seek winter quarters.

It is not to be supposed, however, that delay in deposition beyond somewhat narrow limits, is an indifferent matter. Eggs that do not hatch about the time of thawing produce fry belated in the race and which stand a greatly increased chance of destruction, for at this period a week's delay is serious. Every day hosts of hungry enemies ready to seize them in the egg, are arousing from their winter's sleep, and even after hatching the critical period of egg sac absorption, when the fry are feeble and hampered in their movements by the bulky sac, must be passed through in the face of the enemy. So that it is certain there is some limit and that here, too, natural selection has set its seal.

With the spring spawners natural selection has also operated but in a different way. The most characteristic difference between the spring spawners as a class and the fall spawners as a class, is the rapidity of incubation in the former. In part this is, of course, attributable to the higher water temperature, but the disparity is sufficient to indicate that natural selection has come into play. For example, shad eggs require only from ro down to 4 or even 3 days for incubation, according to the temperature.

In the late fall and through the winter the sandy-gravelly beaches and shallows are deserted, for at the advent of ice they are abandoned by the spawn eating fishes which take refuge in the warmer depths. It is at this period that most beach spawning occurs. Here the eggs lie in comparative safety through the four months required for their development in the icy waters. But in spring on the open beach, eggs are very much exposed to enemies, to fungus and to asphyxiation by mud. Consequently, other things being equal, those eggs will succeed best which are held back (that is, the spawners of which are not stimulated to spawn) until the temperature has risen to such a point as to minimize the time of exposure on the beach. These considerations are reinforced by the known facts that the fry have somewhat narrow temperature limits of maximum

vigor. Thus, lethargic below  $65^{\circ}$ , shad fry thrive between  $68^{\circ}$  and  $72^{\circ}$ . En route to Germany they weakened very fast at  $73^{\circ}$  and all died in four days.<sup>1</sup> On transcontinental journeys  $62-75^{\circ}$  was tolerated, and  $80^{\circ}$  was the danger point. Thus, there must be some upper temperature limit beyond which extinction lies. Whence, among a number of eggs deposited over a somewhat protracted period, those will hatch best and the fry from them will thrive best which were spawned at the right time for the average season. The only way by which such an arrangement could be affected is by the selection of individuals varying favorably with respect to a thermal reflex arc.

10. *The spawning time being so fixed, by a further working backward the time of precedent migration has likewise been determined by natural selection.*

For if they are to spawn at a certain place at a certain time they must leave in time to reach it. We may naturally expect that they must start within fairly narrow time limits, for while laggards will leave no progeny to perpetuate their unreadiness, on the other hand they cannot start too early because, for many species at least, their stay in fresh water leads to death from exhaustion, the outcome of abstinence from food, injuries and attacks of fungus (*Saprolegnia*), immediately after spawning. Their stay in fresh water, therefore, while it must be long enough for spawning, cannot be much lengthened with impunity, or death would precede spawning, thereby bringing about the elimination of the over-ready.

#### MIGRATION HABITS.

Although we are not here directly concerned with the origin of the seek-the-beach impulse, that impulse being taken as our point of departure, it may be pointed out, parenthetically, that it is as certainly temperature-induced as its derivative, the anadromous habit; for the evidence is of the same kind and amount in the one case as in the other, the to-beach migrations taking place in a regular succession from parallel to parallel, northward in the case of species migrating on warming water, and southward in the opposite case. Indeed, so regular is this succession that along-shore migration was formerly believed in.

We now come to the consideration of the anadromous, or river ascending habit. Facts will be adduced to prove that this habit is merely an extension and further elaboration of the seek-the-beach impulse. The foregoing contentions being admitted, the requirements of a sound hypothesis will be satisfied if it can be shown that: A, there are *de facto* beach spawners; B, in type of egg the beach spawners agree with the fresh water species,

<sup>1</sup> Probably here other factors (lack of change of water) co-operated.

and differ from the pelagic forms, and that this difference suffices to explain (a) why species of pelagic genera are so rare in fresh water, and (b) why beach spawners are now so uncommon; C, having once attained to a seek-the-beach impulse, the conditions on the beach were such that, natural selection not opposing, the beach spawners must, through the mere continued action of the temperature responsive mechanism, be led, step by step, into the forming streams of a rising continent; and D, in the streams the necessary accessory habits have been evolved, all in accordance with accepted biological principles.

A. *There are de facto beach spawners.*

On the English coast at least eight species are known which it is unnecessary to enumerate.<sup>1</sup> More important, as being nearly related to the Salmonidæ, is the surf-spawning capelin (*Mallotus villosus*). The herring (*Clupea harengus*) is another species spawning above the ooze area.

B. *In character of egg the beach spawners agree with the fresh water species, and differ from the pelagic forms, and this difference suffices to explain: (a) why species of pelagic genera are so rare in fresh water, and (b) why beach spawners are now so uncommon.*

The eggs of the true fishes (Teleosts) are mainly of two classes, sinking eggs and floating eggs. In either class the eggs may be separable or adhesive.<sup>2</sup> The sinking egg and the adhesive floating egg occur on the beach and in the streams. The free floating egg, however, never occurs in fresh water. Indeed, it could not possibly occur there, as experience in the artificial hatching of these eggs has abundantly demonstrated that the slightest sediment is fatal to them (causing them to sink and those that sink are inevitably lost), and further, that motion is equally fatal, rupturing their delicate shells. Here, therefore, we find a sufficient reason why all marine forms have not become anadromes. Besides it was not necessary that they should, for natural selection has operated to preserve them in an entirely different way, namely by a vast increase in fertility and by throwing over their eggs the Perseus cap of transparency.

If these considerations are correct, it is easy to see why beach spawners are now comparatively uncommon. For on account of their egg type they have always been potential anadromes, and, for reasons given below, the mere continued action of the seek-the-beach impulse must have tended to impel them into the forming streams. That the egg type is the determinant factor in the matter is further implied by the fact that the only

<sup>1</sup> McIntosh: Bull. U. S. Fish Com. for 1893 (1894), XIII, pp. 241-44.

<sup>2</sup>For purposes of fish culture adhesiveness is so important a quality that eggs possessing it are grouped into a separate class.



fresh water species of the pelagic cod family, namely *Lota lota*, has simultaneously with its deviation from the ancestral habitat, deviated from the ancestral to a fresh water type of egg (sinking egg of large size as against the minute floating eggs of its pelagic congeners).

C. *Having once attained to a seek-the-beach impulse the conditions on the beach were such that, natural selection not opposing, the beach spawners must, through the mere continued action of the temperature responsive mechanism, be led, step by step, into the forming streams of a rising continent.*

For if, as urged, that impulse is induced by temperature stimulation of a reflex arc, then on a rising continent with its gradually forming streams, there must occur just that further elaboration of the seek-the-beach impulse that we now see in the anadromous instinct, provided only that natural selection does not oppose. For with a progressively chilling atmosphere, the coolest water will be found where the proportion of water surface and water movement to water bulk is greatest, as in shallow bays, and *de facto* the capelin spawns in the surf. But the coolest of all will be found in estuaries, for here it comes from the streams where the proportion of surface and movement to bulk is ad maximum. Wherefore, to-cooler migrating species advancing to the beach will be deflected more into the estuaries and most into the streams. Up these they will, in accordance with the ever acting physiological impulse of seek-the-cooler, gradually progress, for with the lengthening of the streams the coolest water will ever be found at the receding headwaters.

And, parenthetically, what has been shown here for to-cooler migrating and in-cooling spawning forms, applies equally well, *mutatis mutandis*, to to-warmer migrating and in-warming spawning species. They will find warmer water in the estuaries, and the warmest of all in the streams.

The determinant of the salmon's into the rivers would thus appear to be difference of temperature. What actual evidence is there for this view? Jordan<sup>1</sup> says the blue-back and hump-back salmon's ascend only snow fed streams having sufficient volume to send their waters well out to sea. Contact with cold water probably brings them up earlier than would otherwise have occurred. Spring freshets mean heavy spring runs and correspondingly lighter fall runs. Evermann thinks fresh water, and possibly water of a colder temperature, is the determining factor (letter). And Armistead says that though it has been stated that "fish"<sup>2</sup> pass from the sea into the rivers be-

<sup>1</sup>Science Sketches, 1888, pp. 51-52.

<sup>2</sup>Bull. U. S. Fish Com. for 1893 (1894), XIII, pp. 93-99. "Fish" is a very loose statement, as everything turns on the species. But it will be noted that he mentions "salmon."



cause the latter are warmer, he has found the sea, at least in some places, in late spring often a great deal (very often 10° or more) warmer than the rivers. When in early spring sea temperature is low, no such large runs occur in the Solway as later. In March with east winds, salmon do not run nearly so well as in April, or in April as in May. At Douglas Hall, though fishing was legal from February, the spring run was so regular that nets were not set (scarcity making it unremunerative) before the end of March and some not before April. But later, as the sea warms, a good many run. If it remains cold and the sea temperature low, none run, but as soon as the condition reverses, in come the fish.

Now while, as has been shown, in general river temperatures fluctuate more rapidly than sea temperatures, this does not necessarily apply to streams which flood in spring from the melting of ice and snow. On the contrary many and (though length and volume would make each case different) probably most of such streams retain a low temperature for weeks, in fact till the complete melting of the ice supply. These facts are, moreover, perfectly consonant with the fact that in general the runs of the Salmonids of our west coast take place in the spring progressively from south to north, for the sea warms and the ice melts progressively from south to north, both factors co-operating to make the rivers relatively colder. Further, it agrees with the fact that the runs occur earlier in warm seasons and on freshets. This view accords well with the fact that the blue back and chinook salmons run in both spring and fall, for twice the rivers must be a given number of degrees colder than the sea, while it also affords an explanation of the fact that the dog, humpback and silver salmons do not run till fall, for these last three species are probably out of reach of the rivers. Thus when they come in from sea (which the dog salmon is definitely known to do) they are probably too late to strike cold river currents, the rivers having by that time approximated to or overstepped the sea temperature.

D. *In the streams the necessary accessory instincts have been evolved, all in accordance with accepted biological principles.*

The older fish culturists and some ichthyologists held the view, often in a rather extreme form, that the anadromes were guided by an unerring instinct back to the place of their origin, and such statements were current as that a fish might be depended upon to return not only to the same river in which it was hatched, but to the same tributary of that river, and again, that a fish hatched below a dam would have no instinct to go higher than that dam, wherefore if it were desired that the young on their return from sea should go higher, the eggs must

be hatched higher up, etc. Jordan<sup>1</sup> has, fortunately, exploded this myth, and given a rational and credible explanation which does not deify instinct and make of it a fetic. Briefly, he says fish do not always go up the same river and when they do it is because not ranging far off shore, the chances are large that it will be the current of *that* river they will encounter first when moving inshore. As a defunct hypothesis, therefore, the older view will require no further notice.

The principal accessory instincts which have become super-added in the anadromes as a result of stream life are: *a*, abstinence from food; *b*, head-to-current impulse; and *c*, choice of spawning grounds.

*a. Abstinence from food.*

This habit has many degrees and probably is strict in direct ratio to the length of time required ad minimum and the amount of time available ad maximum, for the species to reach the spawning grounds. We may imagine that when the streams were short the fish could feed by the way and still reach the spawning grounds in time. Even this view, however, might have to be qualified, as only a short stay in fresh water is detrimental to some species from their susceptibility to disease, principally attacks of fungus. Still, in general the food-refusing habit is strict in proportion to length of travel, though this has exceptions, and it may be that in some cases absorption of impulse in the reproductive and motor systems, may suffice to explain the phenomena. It is, however, clear that there must be *some* length of migration which will require the fish to push on under penalty of being belated and leaving no progeny to transmit their hungriness and tardiness at the finish. Given, then, the ever lengthening streams of a rising continent, each year the journey is longer, and less time can be given to feeding by the way. Natural selection would then gradually weed out those individuals which had the feeding impulse strong, and favor those which tended to concentrate their feeding and motor-sexual functions into different portions of the yearly cycle. This is exactly what occurs with those salmons which return to sea after spawning, for they begin feeding voraciously on reaching salt water.

*b. The head-to-current impulse.*

Not the least brilliant page of Romanes's *Mental Evolution in Animals* is that in which he argues that the migratory instinct of the young bird is inherited memory, and that when it is asked: Memory of what, it suffices to answer: Memory of exactly what the old bird remembers, whatever that may be. He ends by citing the belief of Mr. Black that swallows migrate

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<sup>1</sup> Science Sketches, pp. 58-59.

against the south wind, and points out that such a habit could easily be inherited, the warm moist wind exciting an impulse to fly against it. Whatever the case may be with swallows, a strictly analogous factor appears to be the dominant one in guiding the anadromes, namely the head-to-current impulse. This was discovered as soon as fish culture came into vogue. Some of the first fish culturists being somewhat sympathetic toward their finny friends which had such long distances to travel, conceived the idea of making pools in which the fish could rest in their progress up a fishway, with the result that the fish having, so to speak, lost their guiding star, after trying in vain to find among the cross currents a predominant one, finally gave it up and headed to the vortex current floated round and round with (or rather, against) it. Also fish neglect a fishway which does not have a sufficient volume of outflow to attract their attention to its mouth, and one which, though possessing a fair volume, is disadvantageously situated (for example, near a larger outflow, or too far downstream on one side) to follow the main current to the foot of the dam. Finally this head-to-current impulse is so strong that after the migration is over and the heading to current consequently is no longer of use, the salmons still head to the current when floating down stream. It is possible that in the case of species which return to sea, this may have a protective function.<sup>1</sup>

Having seen what determined the beginning of the journey we may now see what determines its end. Given the salmon type of egg and the anadromous habit, natural selection must eliminate all those individuals which do not continue to follow up the ever receding suitable physical conditions (gravelly stretches), and suitable thermal conditions. These coincide only at the headwaters. It is then not necessary to imagine an "unerring instinct." All we have to imagine is a fish started on its way in obedience to one stimulus (temperature trend) recurring in its environment in the exact order in which it has, during incalculable time, recurred in the environment of its progenitors, and, later, being forwarded on its way by a second stimulus (current) which succeeds the first in the exact order in which for incalculable time it has succeeded it in the history

<sup>1</sup>Very recently my friend, Dr. F. Schwyzer, has drawn my attention to the following: *Electrotropismus* by Eugen Blaisius & Fritz Schwyzer (Pflüger's Archiv., 1893, vol. 53). Among other facts the authors observed that under the action of the constant current certain Cyprinids (carp, tench, and others), and the brown trout (*Salmo fario*) underwent a remarkable and fairly constant re-orientation with the head to the positive pole. Fish might be supposed to be subjected to electric stimuli arising from friction between the water and its banks. On the whole, however, the facts adduced would seem to be of a different kind from those of electrotropism.

of the race; and further to imagine the fish impelled forward by pure *vis inertiae* until checked by the interposition of a supersensory inhibitory stimulus (approaching or complete ripeness) and its simultaneous arrival at the spawning grounds. For those who have followed the preceding reasoning, not much argument will be required to show that these last two factors must (through natural selection) coincide. To those who might, for any reason of their own, still urge that this view of a fish as on a par with an automobile torpedo, is inconceivable, it may be answered that while the fish may in addition be a more or less conscious torpedo, it is not necessary to assert it to be any more than such an automobile. In saying that it is a *fish* which is migrating we say it is an organism which has, via natural selection, become *oriented parallel to its environment*. Probably few realize fully what that means. It means nothing less than that to a certain stimulus (temperature trend) it *can respond but in one way*. There is no "choice" in the matter. If there were any "choice" in past ages, and the choosers chose otherwise, they went fossil rapidly and our fish is not their descendant. Again, saying it is a *fish* means that after responding to temperature trend in the one way possible to it, it will respond to the supersensory stimulus (current) in the one way possible to it, and so on. Thus a repetend of function arises merely through a repetend of stimuli, each singly evoking appropriate response in an animal which is the one out of many failures and partial successes which could respond *seriatim* in just the order and to just the extent demanded as the price of its existence.<sup>1</sup>

c. *Choice of spawning grounds.*

Spawning grounds are mainly of three kinds: mud, weeds, and sand, gravel and rock. The selection is by no means a matter of chance, and though too few data exist for the tracing of every detail, certain salient facts are explicable and at least some of the factors can be indicated. These go to show that the choice of spawning grounds has been determined by the egg type via natural selection.

<sup>1</sup>After returning the proof I have seen the paper by Rutter in the *Popular Science Monthly* for July, 1902. It demonstrates beyond the possibility of cavil, the utterly mechanical and unintelligent nature of the phenomenon. In the ocean, fish in general, move against the various local currents produced by the tides. Thus a basis for the elaboration of the head-to-current impulse already existed, prior to the evolution of anadromy. Rutter shows that the Chinook (or Sacramento) Salmon runs into the rivers against the ebb tide. As soon as the tide turns the fish turn and run out against the flood tide. But the flood tide being of shorter duration than the ebb tide, they do not run out as far as they ran in. Consequently, day by day they ascend farther, until past the limital region where tidal movement gives place to river current.

*Mud* (apart from weeds). It is almost impossible that a mud bottom should be a successful spawning ground, as the eggs will almost inevitably be asphyxiated. Wherefore fishes experiencing an impulse to spawn on such bottom will leave few descendants to inherit their delicately sensitive mucous membrane, while those having an impulse to seek harder bottom will transmit to a larger progeny their more roborant mucous membrane. Further, the exception sustains the rule, the only species spawning on mud bottom being certain catfishes, the females of which excavate nests, and attend to (probably aerate) the eggs, and care for the fry.

*Weeds.* Here many species spawn, but they are those with adhesive eggs. In this case, too, physical conditions have determined function, for in these species the impulse to rub the genitals against the bottom is absent, the spawning being done at a leap at, or above, the surface.

*Sand, gravel, and rock.* The nature of these bottoms implies current or wave action sufficiently strong to habitually drive off the mud. And species with separable sinking eggs can safely deposit them here, and here only. Wherefore, given lengthening streams, those individuals will be constantly selected, which spurn the more accessible, softer bottoms, to ascend toilsomely to the current-swept stretches above.

On this class of bottoms some species build "nests" which can be traced in growing complexity. Probably mere restlessness while on the beds (which is exhibited by many species) may have formed the point of departure. This would be highly advantageous if it succeeded in covering over even only a few eggs at first, for the cover of porous sand or gravel would tend to preserve the eggs from egg eaters, and light,<sup>1</sup> and thereby to the predominant survival of over restless fish. The gradations in complexity of the nests favor this view.

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<sup>1</sup> In the early days 30,000 eggs were lost from diffused daylight, and now hatching troughs are provided with light-proof covers.

## MENTAL GROWTH AND DECAY.<sup>1</sup>

BY EDMUND CLARK SANFORD.

Under cover of this somewhat vague title, I want to give you a psychologist's sketch of the course of mental development from the first beginnings of mind at, or before, birth to the final failure and break-up of the powers in old age.

The course of life from birth to death is a continuous one, but it bears at times such marked characteristics that it has been divided off by common consent into various stages, or ages of man, each more or less different from the others. Sometimes three or four stages only are made, sometimes a dozen or more. For our present purposes the traditional seven will be as satisfactory as any, and we shall subdivide where we find it necessary. We shall have, then, Babyhood, Childhood, Youth, Young Manhood, Adult Manhood (or Middle Age), the period of the Elderly, and that of the Aged. The most famous description of these is undoubtedly that of Shakspeare in "As You Like It," but you will recall that it is there put into the mouth of the "melancholy Jaques" and it is in rather spiteful fashion that he describes them. In years the periods are about as follows: Babyhood, birth to 2 or 3 years; Childhood, 2 or 3 to 12 or 14; Youth, 12 or 14 to 25; Young Manhood, 25 to 40; Middle Age, 40 to 55 or 60; Elderly, 55 or 60 to 70; Aged, or Senescent, 70 and beyond. And once more let me say that the stages shift from one to another by imperceptible gradations, and that these limits, therefore, are not to be taken as rigid. They do not lie in the same years for all men; they shift and change from one to another. Let no one be offended, then, if my limits have put him in a stage where he does not feel that he belongs. In his case the limits are probably different.

Before taking up these stages individually let us look for a moment or two at the general laws of growth that apply to the course of life as a whole. One of these was formulated by Minot<sup>2</sup>—in the first instance for the general relations of physical growth. His statement is that "the time required to accomp-

<sup>1</sup>Delivered as an address before the Philosophical Club of Bryn Mawr College, April 4, 1902. The manuscript is here reprinted practically as it was read, except for the addition of certain paragraphs cut out to shorten the delivery.

<sup>2</sup>Article "Age," *Handb. Med. Sci.*, I, 87.

lish a change of a given extent increases with the age of the organism." It is as though the new-born organism were swept into being by a flood of vital energy which from that day sinks slowly to a mere trickle and then ceases altogether. If we come "trailing clouds of glory," it is this superabundant life that gives them their effulgence. The same law is true also of mental growth; and, allowing for certain important though temporary checks or even reversals in the tendency of the rate of change to fall off, it gives a true picture of the increasing fixity that is characteristic of advancing life. It is because the mental changes follow this principle and are most rapid and extensive in babyhood, childhood and youth, that we shall have to devote the major portion of our time to these periods.

Closely connected with this, almost a corollary of it, is Fiske's observation that a lengthened period of infancy goes with a high grade of ultimate development. If the growth power is great and the growing period is long, opportunity is given for reaching high levels of development.

The second general law of growth is one formulated by Wundt.<sup>1</sup> He says, "the later stage arises solely from the preceding stage and yet appears to be a new creation in comparison to it." It is a law of "creative synthesis." "Each stage of development is already held in germ in the preceding," and arises from it "without the interference of any extraneous force, simply by the elevation [to higher potency] of the elemental psychical conditions already active there," "an advance immanent in the properties themselves," "never the entrance of a new specific 'psychic faculty.'" This means, as I take it, that at every stage we shall find sensations associated into perceptions and perceptions into apperceptive groups; that we shall find these colored, each in its degree, with pleasant or unpleasant feeling; that we shall find impulsive and voluntary movements, habits, memories, variations of attention, and all the other elementary psychical phenomena ever undergoing combination and recombination in an ascending series of complexity, till we reach the full range of adult mental life. We shall have abundant illustration of this in what follows, and in the way and to the extent that Wundt had in mind, the law is undoubtedly true, though it is not a complete statement of the matter.

But let us now return to our stages of life, and first of all to the period of Babyhood—the stretch from birth to the end of the second or third year—the time of close dependence upon the mother. The beginning of the period is definitely marked;

<sup>1</sup> *Völkerpsychologie*, I, 242.



its close less definitely, though it may be set at the end of the teething period, two years to two years and a half, when the child is as ready as he will be for some time to deal with the common food of adults. Short as this period is, it is yet long enough to contain several quite distinct sub-periods. There is first the period of the *new-born*—the first few days after birth, when babies usually lose (or at least do not gain) in weight and are recovering from the catastrophe of birth and adjusting themselves to their new conditions of life. Here, for example, is the average change in the case of thirty-three children for the first six days: —139 grams, —64 gr., + 33, + 50, + 50, + 36.

Then follows the period of the nursing child up to the eighth or ninth month, or even to the end of the first year, during which he is getting control of his sense organs and his muscles, and making his first beginnings of the knowledge of things and their properties. And after this again comes a stage of less dependent babyhood, extending on to childhood.

The progress through the whole period of Babyhood may be indicated by some of its characteristic events. The baby is three months old before he can do much at holding up his head, and four months old before he can grasp effectively at what he sees. By the sixth month he gets his first tooth, and perhaps begins to imitate and to know his own name. By the seventh month he has learned to sit up. By the eighth or ninth month he is being weaned. By the ninth or tenth he may be creeping; by the twelfth he is standing and perhaps making his first attempts at walking, and beginning also to master a few words. By the fifteenth or eighteenth month the soft pulsating spot on the top of his head, the fontanelle, corresponding to the unclosed opening through the skull, is finally closed up. By the twenty-fourth to the thirtieth month he has the last of his first set of teeth. By the thirty-sixth month he has perhaps shown both his powers of locomotion and his independence by running away.

The mental development taking place through this period is at first so largely a matter of getting the use of the sense organs and the muscles that it is hardly possible to treat of mental growth apart from physical; we shall therefore ask no pardon for presenting a number of physical details. The *new born* baby comes into the world not only considerably out of proportion when measured according to adult standards—too big in the head, too small in the chest, too short in the legs—but also very far from complete, physically. His muscles are weak and not under his control; his eyes do not move together, he cannot look where he will, very likely he cannot see color at all. His ears are stopped. His nervous system is ready

for its work in the parts necessary for maintaining life, but very little so in those that furnish the basis for preception and voluntary movement. He has then, and has had for weeks his full quota of brain cells as to number, but many are as yet too little grown to be of much service. He will be nine months old before his brain in gross organization, even, is like that of an adult. In all probability mental growth must often wait for the development of the necessary cells and fibers of its physical substratum. It is small wonder, then, if his mind is practically non-existent. He can have had as yet but the vaguest and most unconnected sensations, if he has had any at all. He has none of the apperceptive groups by means of which things are perceived and understood. Or to put the same thing in other words, he has not yet had the experience necessary to give meaning to his simplest sense impressions. His eye rests upon a bright spot of sunlight:—he does not know it is light, nor its size, nor its distance; it is neither here nor there to him; he does not know that he sees, he does not *know* anything. He just receives an excitation—and that passively—and dully likes it or dislikes it. He is not alert mentally, either. His waking condition can not be very far from the sleep condition in which he passes so much of his time. As Professor James<sup>1</sup> remarks: "Prior to all impressions on sense organs the brain is plunged in deep sleep, and consciousness is practically non-existent."

And even when an ordinary excitation does penetrate to the slumberous little consciousness, the utmost response which it awakes (to quote Professor James again) is best "expressed by the bare interjection 'lo!'" — except, indeed, in the case of pains or sharp discomforts which doubtless make a more intense and voluminous, though probably no more distinct, impression. The story is told of a young mother who brought in her bachelor brother to see the new baby asleep in its cradle. Among the other things she asked if he didn't think the baby was very intelligent. He said he did n't feel himself altogether a competent judge and asked what the baby did that was so intelligent. The mother exclaimed, "Why, you great stupid, don't you see how intelligently he breathes!" The mother did n't miss by far the baby's highest pitch of intelligence.

In a somewhat more drastic fashion we may bring ourselves to a realization of the mental state in early babyhood by remembering that idiots and imbeciles are cases of "arrested development." I do not mean to say that in any case the idiot has simply stood still where he stopped; but, making all allowances, it is simple fact to say that any baby stopped

<sup>1</sup>Psy. II, p. 7.

mentally during his babyhood would be an idiot or an imbecile. What I have just said is indeed true, but there is an abysmal difference between the two in that for one it is a healthy stage in progress toward full growth, and in the other, a permanent abiding place.

And the new-born baby begins to grow at once. Whenever he is awake, sensations pour in upon him and by degrees are knitted up into the tissue of his gradually forming mind. If he is at first, as to his mind, *tabula rasa*—an unwritten page—it is not an absolutely uniform page, but one rather on which the ink will flow much more readily in some directions than in others, and in which certain general outlines will, in the usual course of things, be almost sure to take shape. There are certain growth tendencies somehow latent in the nervous system, and there are certain experiences which the baby's human body and his situation in the midst of a human family are sure to bring him; and these growth tendencies and human experiences, between them, see to it that his mind shall grow up into something that we shall recognize as a human mind.

Let us take as a typical instance the development of voluntary control in the arm and hand. Every one is familiar with the vague convulsive movements so characteristic of little babies, the throwing about of the arms and legs, the grimaces, and the wriggings of the fingers. They are at first purely spontaneous, made without the baby's intention, very likely at times to his great surprise, by an involuntary discharge of his unstable nerve centers, or as an overflow from other centers actively stimulated. They belong to the early stages of babyhood, and gradually disappear as voluntary movements are established. They owe their importance, indeed, to the fact that they pave the way for voluntary movements. In order that a child should make a movement voluntarily he must know how it feels, and this the spontaneous movements teach him. They also furnish a great mass of partly organized movements from which certain preferred ones are selected.

One of the most characteristic of these early arm movements is that of bending at the elbow and carrying the hands toward the face—really a return to the position long occupied by them before birth. As the hands are brought up in this way they now and then wander by accident into the mouth.

At this stage the mouth and tongue are the leading organs of grasping and touch, and the sucking movements among the readiest that the baby possesses. Anything brought to the mouth is sucked and mumbled with the greatest enjoyment. His pleasure is often assumed to be a pleasure of taste, and babies are set down as little gourmands, whose chief delight

is eating; while it is probably the fact that what they are really enjoying are the muscular pleasures of sucking and the tactile pleasures of feeling of objects with the lips and tongue. When the hands come into the mouth in the way just described they also are sucked and mumbled like other things, and perhaps give rise to an especial pleasure because of the double touch sensations—in both mouth and hand—that are then experienced. At any rate the pleasures which the baby gets from this happy coincidence of hand and mouth put a premium on the repetition of the movements that produced it, and the baby is soon found to be bringing his hand to his mouth voluntarily. By the middle of the third month, perhaps, the baby has mastered the movement, and specialized upon the thumb as the most convenient part of the hand for sucking. But the hand is not yet recognized as a part of the same person as the mouth, and the baby is often astonished and disappointed to find that he cannot throw his arms about and go on sucking his thumb at the same time. The mouth is a grasping organ as well as a tactile one, and at this time the baby dives down with his head to capture his thumb quite as much as he raises his arm to bring it to his mouth.

The next step of advance comes from the side of the hand-movement. From the very first the baby's hands have tended to close reflexly upon whatever has come in contact with them—a survival, very likely, from the arboreal ancestors of man, and a time when it was a life-and-death matter that a baby should cling tight to the hairy body of its mother and leave both her hands free for fight or flight. (That this is not altogether a biologist's dream is made very probable by the fact of the baby's greatly advanced development in arms as compared with legs, by his early ability and passion for climbing, and by the experiment of Dr. Robinson, who found in many babies tested by him an ability to hang by their hands from a supporting bar far in excess, apparently, of their ability in most other directions.)

This reflex mechanical closure of the fingers upon objects with which they come in contact leads in the natural course of things—and, as before, quite without the baby's thought or intention—to the carrying of things clasped to the mouth, along with the hands. New pleasure results from the oral investigation of these things, and by the end of the third month the baby is found to be making deliberate efforts to carry things to his mouth.

In the meantime the touch sensations of the hand itself have not been running wholly to waste, and hand-grasping has gradually become more skillful. Objects are picked up when they touch the back or palm of the hand, and are fumbled for in a

blind way under guidance of touch alone. It is nearly a month more—say the end of the fourth month—before they come under the control of the eye. There is a time, indeed, when the eyes look on at the fumbling hands with interest, but without assisting them. Even when thus guided, the grasping for a time is still in the interest of the mouth; but the manual part improves as time passes, until by and by, perhaps toward the end of the fifth month, objects begin to be grasped in order to be handled and pulled about, rather than to be carried to the mouth. In the next month the pleasure of manual manipulation is great and mouth-grasping and its pleasures are on the wane, and so the carrying of things to the mouth becomes infrequent. By the ninth month hand-grasping is so perfect that the baby may be found able to pick up pins or to amuse himself in playing with a single hair.

Along with this increase in motor skill has gone an increase in the power of tactile discrimination, a growth and refinement really of a crop of tactual ideas; and in the tenth month the forefinger begins to take its place as a special organ for delicate touch investigations. Upon this follows still later another stage of development—interesting because it carries us over into another field—that of gesture language. The forefinger, having become a special organ for investigating-touch, is stretched out and applied to objects within arm's length, and, by an easy step, toward those that the baby would like to touch; and then (perhaps supported by the still earlier gesture of holding out the arms to objects of desire) it comes to indicate objects desired and finally any object, thus ending as the usual indicative gesture of the pointing finger.

In brief review, then, we have the hand carried to the mouth first by spontaneous movements, then intentionally. Its reflex grasping brings objects with it to the mouth, at first accidentally and then intentionally. Its reflex grasping gradually goes over into intentional grasping under the blind guidance of touch alone, which later yields in part to that of the eyes, (the sensations of the wider visual field coming to serve vicariously for its own more restricted tactile sensations). The growing refinement of its own tactile sensations leads, however, to the selection of the forefinger for tactile investigation, and the organ thus selected is by and by pressed into the service of communication.

There is not time to go into detail in regard to these matters, nor to recount through what stages the art of seeing or of walking is developed, or how the babbling voice-play of the baby becomes articulate speech. We must leave details with the typical case already given. But there are other general char-

acteristics, especially of the later part of the period, that we must give a word to.

The baby's chief business, after getting some sort of control of his sense organs and muscles, is to learn something of the properties and peculiarities of things about him. He begins this, indeed, a good while before his control of these organs is by any means perfect. Everything must be seen, touched, tasted, handled; he must do everything he sees others do; he must investigate. He may take off the top of a can and put it on a hundred times running, and as long as he does it he is probably learning something from it. When a baby keeps you busy picking up his rattle, which he drops again as soon as you give it to him, he is carrying on what seems to him an interesting game, but he is also learning in a practical way something about the law of gravity and how things behave when they are left unsupported. That he does so unintentionally and in the form of play does not alter the fact in the least. Sometimes the learning is wholly accidental, as when the baby touches the stove or tips over the ink bottle; but in accidents again, as much as in play, he is learning. He goes to school all the time he is awake, and learns for the most part not only with interest but with the utmost zeal and enthusiasm.

He is not a very concentrated student, however. He is interested in everything, but in nothing long. As one writer has phrased it, his attention is very easy to *obtain* but very hard to *retain*. Emotionally it is just the same; he is "pleased with a rattle and tickled with a straw," but cares for neither for very long together. On the other hand he is extremely conservative and will come back again and again to the same rattle and the same straw. In some things he is even the abject slave of habit. He cannot go to sleep without a feather to tickle his lips and nose with, or without the corner of the same blanket to suck. He is light-hearted unless he is ill, but is easily moved to tears. He is fearful of unfamiliar things (as he needs to be in a world of things evil as well as good) but much attracted also by whatever is new (as he needs again to be, if he is finally to know and master his world). He is affectionate but not loyal (he will forget his own mother in a few weeks). He is easily angered, but not resentful. He is largely self-regardful, as both his needs and his training dictate that he shall be, but he will cry if harm is threatened to those he loves. He is impulsive; his powers of control are low; he is an easy mark for slight temptations; he has no stability of will and no constancy of purpose. What he obstinately refuses to do now, he may be quite willing to do in the changed mood of a few minutes later.

All this inconstancy of feeling and instability of will come



from the same causes. The little child (and still more the baby) lacks the fixed habits of thought and feeling (in technical language, the apperceptive masses) which put the solid frame-work into adult mind and character.

For a similar reason a little child is apt to be less surprised than an adult at the tricks of a sleight-of-hand performer, because the tricks do not seem much more wonderful than many other things he sees. As far as he knows, it may be as easy to take rabbits out of a silk hat as it is to make flour and eggs and butter and sugar into a loaf of cake. He is impressed equally by *all* such things because he has not yet the habits of thought that make one set of phenomena extremely strange and incredible, and the other quite ordinary. He has also a very imperfect idea of consequences, because he yet lacks experience. All psychical development from babyhood to old age can be summed up in terms of these two things—a growing complexity and fixity of habit, adjusted to remoter and remoter contingences, and all formed under pressure of experience. Of course babies differ enormously in all these things; what I have said may be only partially true of any one particular baby. But there yet remain enough points of similarity to give us a pretty definite set of ideas when the word is mentioned,—and some of these I have enumerated.

Toward the end of the babyhood period the baby is fairly familiar with the common properties of the things about him: he can walk and talk as much as he needs. He will make the coarser adjustments, keep his fingers out of the candle-flame, drink his milk, go to the kitchen when he wants a cookie. Psychologically he has become too complex, too active, and too observant for complete and overt observation and note-taking; he has "become as one of us to know good and evil." His progress after this is less and less unlike the progress of adults.

With the end of his third year he passes out of babyhood and into childhood—the age of general mental adjustments as babyhood was that of physical adjustments. It is the great habit forming period. In its earlier part it is a continuation of the learning of bodily control, of language, and of the properties of things and characters of persons, already begun in babyhood, together with the beginning of moral and social requirements, obedience, clean hands and face, "yes, ma'am" to ladies and "yes, sir" to gentlemen. In the latter part it is the school age—the time when society seizes upon the boy and forces him to learn the indispensable conventions of modern life, reading, writing and ciphering. It is the age of "the whining school boy with his satchel and shining morning face, creeping like snail unwillingly to school." (The limit of the



period is sometimes recognized in legislation. The compulsory education law in Massachusetts, for example, requires that children attend school till they are fourteen years old.)

As these differences indicate, the whole period falls apart readily into two sub-periods: early childhood, extending from three to about seven; and later childhood, extending from eight to the beginning of the adolescent changes at about twelve for girls and fourteen for boys, with a year of instability and change lying at seven or eight between the two sub-periods.

The importance of the turning point at about seven years is really very great. At that time the brain reaches nearly its adult size and the direction of its development probably changes. From birth to about the seventh year the cells have been growing toward their final bulk and form; after seven years, growth is probably in their finer intercommunicating branches—in the organization of the brain substance rather than in increase in mass.

A remarkable fact with regard to the dreams of the blind seems to point to the existence of a line of demarkation at about this same time. It is this: that persons who become blind during babyhood or early childhood (that is before seven years old) rarely or never dream of seeing; while those who become blind after that age do dream of seeing more or less frequently—more frequently of course as the interval between the beginning of their blindness and the seven year limit increases. It has been conjectured, with much plausibility, that the visual areas of the brain need the help of incoming excitations in order to grow up to full perfection; and, if deprived of these by the loss of the eyes before the most of their growing is done, are never able to reach the condition necessary for carrying the vivid presentation of the visual images on into later years. In order that an image may return in dreams it must not only be preserved but it must have formed some sort of associative links with other things in order that it may be reintroduced into consciousness. The perfection of the visual center probably involves the adequate growth of interconnections with other centers as well.

The falling away of the milk teeth and the coming of the permanent set begins a little before this critical time.

Let me characterize the two sub-periods a little more fully. The first is the period of Early Childhood. It is a period of somewhat rapid growth and change, though less so than the period of Babyhood. At three years the child has something over half his adult stature and at seven years more than two-thirds. He has still a good deal to do in getting control of his muscles; he is clumsy, especially at first; he tumbles down easily and often; he cannot throw or catch a ball very well;

fragile things are unsafe in his vicinity ; if he has a knife, he cuts his finger. He can manage his sense organs with some skill, but he has yet a good deal to learn of the more refined and inferential use of them. He is probably not at home in the conventional ways of representing solid forms ; he does not fully understand perspective drawings, nor the meaning of light and shade in pictures. His visual world itself is limited to things near the ground. He does not look up much, nor look far away.

Mentally he is growing continuously in complexity of thought and reaction under the guidance of several strong and important instincts : the instinct to investigate, to ask questions, to experiment ; and especially to imitate and to play. He lives the life of the senses, simpler motor activities and imagination. His mind is active and he has not as yet the experience that corrects illusions, nor the critical attitude that dissects them ; he is readily open to suggestions. He is fond of stories and they appeal to him powerfully, but they must be of action, with clearly marked ethical import. The prince must always slaughter the giant and marry the princess.

How narrow the experience of a little child really is and how little he knows outside the world of that experience is strikingly shown by the studies of the contents of children's minds on entering school, *i. e.*, when near the end of this first sub-period. In the tests made by Dr. Hall some years ago on Boston children, for example, more than half did not know their own wrists and ankles by those names and not more than one in five knew that they had hearts, lungs or ribs ; one in five did not know right hand from left ; about one in seven did not know the stars and even one in fourteen or fifteen did not know the moon. Over nine in ten did not know that leathern things came from animals, nor the origin of cotton things. Over eight in ten did not know what flour or bricks are made of, seven in ten did not know the shape of the world, and almost that proportion did not know the origin of woollen things. Half did not know that wooden things are from trees and one in five did not know the source of milk. Few children have any mathematical knowledge extending beyond four. And finally what knowledge they do have is scattering and unsystematic. This is of course toward the end of the sub-period ; at its beginning, they are ignorant of almost everything not lying immediately within their own experience and frequently brought to their attention.

This is all natural and as it should be. The child is yet laying the foundations of knowledge and his range of facts is not especially important. He is getting his knowledge at first hand and working it up into habit and fixed forms of reaction.

He is also gradually laying out the lines of what will be his habits of standing, sitting, walking, speaking. His temperamental tendencies are showing themselves more and more clearly, and in the interaction between these and his surroundings his moral qualities are also beginning to take shape—his attitude towards difficulty and toward authority.

His moral standards are as yet borrowed from adults and often shifting, but he is coming slowly to feel that some things can be done with good after-effects and some cannot. He has much to learn; he has, for example, no native modesty, and little idea of the property rights of others, or indeed of any rights of others at all. He may often exhibit a curious mixture of affection and selfishness. A story runs of two little fellows, whom I may call George and Charlie. One evening George and Charlie came into their nursery at supper time and found only one orange set out upon their table along with the other things. Suddenly George burst into tears. The nurse tried to comfort him and asked him what could be the matter. He replied between his sobs: "There isn't any orange for Charlie." Childish morality is not and ought not to be a replica of adult morality. If the child is making progress toward truth-telling, obedience and kindliness, it is all that should be asked. It is not, however, a time when parents and teachers may be neglectful. The more fundamental habits, both physical and mental, are slowly forming under the guidance of precept in part, but infinitely more through imitation and the all-moulding influence of environment.

Most of the little child's waking time is spent in *play*, and perhaps we could not characterize the whole sub-period better than by calling it the period of simple play—pleasant, spontaneous, unorganized activity both of mind and body, but leading by the most direct route to the formation of such general habits of body and mind as I have just mentioned.

In this period begins also what is to be the chief characteristic of the following sub-period: the child begins to go to school. In the earlier part of it, even, he may enter the Kindergarten, and by the latter part he really starts in upon the process of formal education; but the pedagogical principles of the time should be borrowed largely from the previous and not from the following stage. The chief one should be "non-interference." See that the child has unlimited opportunity; keep him from getting set in habits that will hinder him later; and let his spontaneity do the rest. These two points alone will furnish the intelligent parent and teacher with all he will care to do.

With the transition into the period of later childhood comes more or less physical change and disturbance. The child at seven or eight is often more easily fatigued than he is at six

or nine ; and may be more or less upset. One student of the period is inclined to believe the extent of change at this age as great as that which at twelve or fourteen marks the beginning of adolescence.

After the transition-time comes the sub-period of later childhood from nine to twelve or fourteen. This is the school age *par excellence*, the time for learning things. Physically the period is one of steady growth, though the rate is probably not so rapid as during the transition-period preceding it and certainly not so rapid as in the one following it. The balance of physical functions is good. It is a time of health and small liability to disease. The coarser muscular adjustments are now well in hand and the finer ones are rapidly coming under control. It is the time for beginning practice upon musical instruments, for manual training and the like.

And the boy is in a similar condition mentally ; he has most of the general information that he needs for daily use ; his powers of attention and his mastery of language are sufficient to allow him to take up more difficult and abstract studies. He is solidified enough now both in body and mind to *work* in earnest—not in excess of course, but certainly to do some things that are not pure play. The boy who does not learn to *work* now misses one of the best things that can be taught him at this stage. It is the time for learning multiplication tables and paradigms and whatever else comes only by drill and drudgery. His powers of reflection are not as yet very far developed and he is better for learning tables and rules than for dealing with abstract principles. In feeling he is self-regardful, though not so unrestrainedly so as earlier. His self-control and persistence are only moderate. His will is not yet very strong. His social feeling in general is small (he is apt to be a tease and tormentor of those about him, and a depredator of orchards), but with reference to his particular group of companions he may be very faithful. His plays now begin to be co-operative (*i. e.*, team plays, a great advance upon the individualistic plays of early childhood) and games are played in which rigid subordination to the rules of the game are required—both involving valuable lessons for those that engage in them.

In the latter part of the time "gangs" develop and the boy's hand may seem to be against society in general, but society does not fail to exert an immense influence upon the boy in spite of himself. It provides the general atmosphere in which he grows up and from which he can never escape. He breathes in the war spirit in times of war (even in early childhood) and later gets a bent toward sport from the popular interest in football or pugilistics, or yachting, or in many less tangible matters.

In conduct and morals as well as in other things, it is a time for drill. Discipline must be intelligent and adapted to the nature of the subject under training; it must be sympathetic, but it must also be vigorous. Work must be well done; reasonable requirements must be fulfilled to the letter, or habits of slipshod work and unreliability are likely to result.

If I should attempt to sum up the sub-period in a single word I do not know that I could do better than to use the word "boy" without modification or adjective of any sort. Whatever that word conveys to you belongs to this period. At the end of it, say at fourteen years, his adaptation to his surroundings is tolerably perfect. He can ride, skate, swim, dance, play tennis, baseball, football and other games, and do what he will with his body (barring a few feats of special strength or skill). He knows how to take care of himself in his own town, knows where to get what he wants. The period is one of such complete and happy balance as to lead an eminent lecturer on adolescence to suggest that it corresponds to a long stage in racial development when the race fitted fairly well with its surroundings and solidified its attainments rather than advanced by rapid strides; and the superficial resemblances between the wild life of the savage and the instinctive hankerings of the twelve or fourteen year old boy are too plain to have escaped frequent remark.

I have spoken so far of boys alone. In babyhood and early childhood there are probably few differences between boys and girls worth considering. In later childhood differences probably appear, and would very likely repay careful study. In the next period they become marked.

*Adolescence.*—The next period, that of adolescence, or youth, extends from the close of the period of childhood to that of physical maturity at about twenty for young women and twenty-five for young men. The period is ushered in by a time of rapid physical growth—really a transition period between childhood and youth proper. This begins earlier, as I have said, in girls than in boys, and the girls being but a little inferior in height and weight at the start, soon surpass the boys and for two or three years are both taller and heavier. By the time they are fifteen or sixteen, however, the boys have begun their stage of rapid growth and are soon in the lead again, and so continue for the rest of their lives. The rate of growth falls off by degrees and becomes very slight towards the end of the adolescent period. At the ages specified it is practically at an end, though there is some reason to think that in the case of men the stature may go on increasing up to thirty-five and the weight even after that time, though in the latter case it is gain in fat and not in the effective size of

the organs. Soon after the beginning of the first rapid growth the characteristic changes begin in the organs of sex, attended and followed by the various secondary changes, both physical and mental, that go with physical maturity. The figure fills out, the voice changes, the beard starts, the masculine and feminine differences in mental attitude gather distinctness, and the boy and girl bloom gradually into manhood and womanhood. The whole period of adolescence is one of transition and is marked, as such periods often are, by maladjustment and general disturbance. And like such periods, again, it is of great importance. It is a time when the most powerful influences are at work both within and without, when the youth receives his racial inheritance and comes into his full estate as a man. What is not accomplished now in the determination of personal qualities or in the grounding of character, runs small risk of being accomplished later. The decisive nature of the period is recognized by savages in their ordeals and other rites of initiation into full tribal standing, and among ourselves by placing the age of majority at eighteen for girls and twenty-one for boys.

The changes occurring during this period affect all relations of life. I shall speak briefly of a few of them.

*First Physical Changes.* I have already spoken of the rapid growth at first and the specific sex changes, but these are by no means all. It is the last upward sweep of the powers of physical growth. New physical inheritances seem to come out, and a boy or girl who has resembled one parent may now grow to look more like the other; or family diseases may appear, insanity or tuberculosis, which, if not directly inherited, now find the system less able to withstand their attacks. Yet in spite of the tendencies and in spite of the troubles arising from the temporary lack of balance in the growing organs, youth is a time of high vitality; there is energy for anything—physical or mental. The energy, however, may not be well co-ordinated. In the earlier stages the youth is clumsy; he has n't strength proportionate to the size of his muscles; he has n't himself in hand. Or he may take up with some one-sided idea of life or theory of reform and hold it with a devotion out of proportion to its importance. But he has the energy, and the lack of balance passes away in time.

The characteristic sports of the adolescent stage are mostly team-plays as in later boyhood, but are carried on with more vigor and success, and toward the close of the period are pushed to the limit of strain and intensity, *e. g.*, college football, baseball and boat racing. Others, again, introduce an element of single combat, like boxing and the German student-duels. Such sports can flourish only at a time when the physical



powers both of endurance and control have reached a high degree of perfection.

Profound physical changes like those of this period can hardly take place without involving equally profound mental changes. One has only to think of the way in which his own mental world may change color in seasickness and recovery from it, or even from the alternation of rest and fatigue, to see reasons for all kinds of glooms and rose-lights in the world of the adolescent. Of these I shall speak more fully in a moment. I wish to speak first of his more intellectual characteristics. It is a time of great mental awakening. The youth's powers of reasoning and attention are developing rapidly. He has now many of the groups of apperceiving ideas (the distilled essence of experience), by which he can take in and react upon some of the larger problems of life. His eyes are opening, he begins to meet in his reading and in conversation with the ideas that have stirred the world. His course of study brings him to the Greek tragedies, the Roman Empire, the Renaissance, the Reformation, modern science—is it any wonder that the thoughts that stirred men at these periods, though coming distantly now and from the printed page, should cause an intellectual awakening in a mind that comes to them fresh and for the first time? He has n't yet the balance and poise that he will get later; he takes these things in a one-sided way often, and runs up some parts of his intellectual building much faster than others. His interests and likes and dislikes may be quite unstable; he may be something of a faddist, now interested in one thing and now in another, but such a symptom is not fatal nor even bad, if he outgrow it in its time; for in the end he will go into his chosen field carrying some spoils from all upon which he has entered.

It is not so much these, however, that give the characteristic color to the mental life of youth, as those that root in emotion. This is the age of Jacques's "lover sighing like a furnace, with a woeful ballad made to his mistress' eyebrow," and it is true that in this stage the boy begins to notice the girls in a little different way and perhaps to take a little more pains with his dress and manners; he may have his first love affairs—transient and numerous and mostly innocuous. Often he is drawn toward a lady much older than himself, who may indeed understand him better and be kinder to him than the girls of his own age would be likely to be. And the devotion which a sixteen year old boy sometimes gives to such a woman is more like worship than anything she is likely to receive from older lovers. Something similar happens to the girls as well, and the passion of devotion is at times so strong as to take on aberrant forms. Young girls in college it is reported



at times develop passionate attachments for persons of their own sex, some instructor or fellow student,—a relation which, while it may promise something of pleasure, tends, if it go too far and last too long, to be decidedly unwholesome.

But these romantic feelings are but a part of the emotional life of the time, and Jaques has as usual picked out a single feature in order to heighten the effect of his picture. The general social feelings are much strengthened. Lifelong friendships are formed—there are no friendships like college friendships, it has been said. Altruistic emotion strengthens, and to many a boy the vision of a life of self-sacrifice for the general good comes like a Star of Bethlehem. Life at this time is taking on a new meaning, and in the intervals of his activity the youth dreams out his own future and forms his ideals. It is a time of aspiration. It is the time in which George Eliot describes Maggie Tulliver as feeling a "wide hopeless yearning for that something, whatever it was that was greatest and best on earth," and of which Longfellow sings, "A boy's will is the wind's will, and the thoughts of youth are long, long thoughts."

It is a time of hero-worship also—sometimes real people, sometimes imaginary ones. It is the time for day dreaming, for air castles, for romance, for ideal literature in poetry and prose. The day dreams and ideals are sometimes impossible; they are often crude; they are always inexperienced; but they are not therefore fair targets for ridicule. The boy of sixteen may be doing a deal more of serious thinking than he gets credit for. He realizes his inexperience and the crudity of his thought, and he is eager enough for something better, but he hates to have what he has taken pleasure in laughed at (or even smiled over), and so does n't talk of it. As he advances in age his ideas become more definite and tangible; he gets down toward reality, and in the end experience furnishes all the correction necessary. Perhaps too much! At this early age he is ready to put his ideals into practice; he may not be later. It is the youth, who, "When Duty whispers low, 'Thou must,' replies, 'I can.'"

At this time also religious and moral questions come to the fore. Statistics that have been gathered show that the adolescent period, especially its earlier part, is the natural time for the rise of religious feeling. Most conversions occur at that time, and confirmation is administered at about that age by those churches that make use of it. But the development is not always smooth. The boy begins to hear questions raised about the moral code that he has accepted so far on authority or under compulsion; he learns of other theologies than that he has heard from the local pulpit. He feels the need of settling these things for himself, or feels perhaps the simple impulse

to assert his independence, and the result is that theologies and moral codes go themselves into the fiery furnace. If those which he has been taught have been foolish and if the youthful spirit itself is a fiery one, they have small chance of coming out except as ashes; and even if they have been right and sound, but have been foolishly and dogmatically presented, they will be saved "so as by fire." But not all spirits are thus fiery and not all teaching needs revision. Many come through their youth with no very serious storm and stress period, and gradually find themselves realizing in earnest the religious experiences that they have heard vaguely spoken of before. The real safe guard against the more uncomfortable sort of experience first spoken of is home teaching which does not insist on non-essentials. The way to make a wreck as complete as that which overtook the "one hoss shay" is to make every part of your creed exactly as strong as every other part. And the real guiding star for those who are themselves in such a state is the *steady habit of right conduct*. Those who can keep their feet on the path of daily right living will find their theological skies clearing of themselves, and that before long.

But the boy himself is only half the story. He is not only different himself but he begins to be treated differently by others. Much of the hobble-de-hoy condition comes from the incompleteness of his fit into society. He puts on the modern *toga virilis* of long trousers and a tailed coat, and people begin to call him "Mister." He goes to parties where he does not know quite how to behave, and makes calls which he does not at all know how to terminate. Much of the difference in others' treatment of him is quite unconscious—brought out in others by his increasing stature and general development; but new things are expected of him and he responds to them, and thus action and counteraction work him along till his estate is fully recognized on both sides. Unfortunately, however, those nearest him are often slowest of all to recognize the change. (If Ponce de Leon had only examined the opinions which his kinsfolk and elders entertained of him he would undoubtedly have discovered his fountain of immortal youth). And even when his elders do recognize the new conditions in some degree, their treatment of him is apt to be uneven. At one time they require a man's behavior of him and again treat him like a boy. This is naturally more or less exasperating and unsettling, and it is often by no means a bad plan for a youth to go away from home at this period, and stay away until he can come back without the limitations of others' recollections of him. It also satisfies the strong cravings of this period for an independent life. Even boys in homes that they love feel it. It is the *Wanderlust*—to

get away, to join the army, to run away to sea, to see the world, to have some experience. It is the same feeling in another form that leads to the intellectual independence already spoken of. And it is a wise parent who can trust his own early training of the boy and remember, when he sees his son apparently drifting away from him, that the separation is a natural process of growth, and that if the training has been sound the boy will in the end return no less loyal than before and the richer for his knowledge of his own powers.

Another way in which society contributes to the peculiar character of youth is by keeping the boy away from action and responsibility, and shutting him up, as it were, until he is old enough to take his part in the real business of life. This, it seems to me, is responsible for the major part of the dreaminess and the mental "mumps and measles" of this period. These soon disappear under the touch of reality, and, I fancy, do not much bother those whose circumstances bring them early into active participation in affairs. It is hard work learning to swim when one is kept for the most part away from the water.

At the end of this period—at twenty-five—the young man is physically perfect, trained for his life work (as far as general training goes), and, though largely inexperienced, is eager to enter upon it. If I should try to characterize the period briefly I might say that it is the tuning of the orchestra; it is the opening of the flower and the promise of fruit; it is the declaration of independence; it is the new birth. If my figures seem mixed I can only reply that so is the period.

*Young Manhood.* The stage that follows is that of young manhood. It is the time which Jaques assigns to the soldier:

"Then the soldier,  
Full of strange oaths, and bearded like the pard,  
Jealous in honor, sudden and quick in quarrel,  
Seeking the bubble reputation  
Even in the cannon's mouth."

It is the time for action. The young man is full of energy; he is capable of much hard work; Chicago is said to be made by men under forty years old. It is the age of the under officers in the army and navy; young men for war, old men for counsel. It is the time when the young business man is getting his experience, laying up his capital and winning the confidence of his business acquaintances; the Napoleons of finance are said to be for the most part about forty years old. It is the time when the young professional man is laying the foundations of his professional success in law and medicine, and while these may not be "full of strange oaths" and bearded like panthers, there are also other haunts of "the bubble reputation" than the cannon's mouth. There is said also to be a "dead line" for

clergymen at forty, beyond which they are not likely to receive flattering calls to large churches. It is a time of hope—the world, at least at the beginning, is almost untried; anything may be possible. Even a modest young man may hesitate to say how high his star may not ascend. His natural force is not abated; he can pay the price of success; late hours either of work or dissipation can be borne. Indeed it is one of the first authoritative signs of middle life when the young man or woman begins in earnest to think much of to-morrow's lassitude in connection with to-day's pleasure. As a whole the period is one of hard and eager effort and of many lessons in the strenuous school of experience. In this period in the usual course of events a young man falls in love more effectively, and undertakes the support of a wife and family, and often carries with a light heart the double burden of business cares and anxieties for growing children. In a woman's life the corresponding period comes a little earlier. It is the time when the care of a family of little children takes all her time and energy; or if she be earning her own living, when she also is making her professional reputation as musician, artist, teacher or philanthropist. I fancy also that it would be found that many of the women active in the management of church or social affairs are of about this age—though not exclusively nor even predominantly perhaps, for there comes later an Indian summer period when women are often freer to undertake such things.

At about forty, the close of this period, we have another stage of transition, a sort of a second adolescence it might be called, when the young man puts off the "young" and becomes man pure and simple—the adult on the threshold of middle age. This second adolescence is not often so marked as the earlier one. A man of forty is less open in the expression of his feelings and there are fewer competent observers. Those who are younger think that grown up people are all rather beyond the point of feeling at all. (I fear myself, that if I were to press the question home upon you, you would be obliged to confess that a person of forty seems to you rather staid and old—in fact hopelessly adult.) And those who are older do not notice, or think it but natural that advancing years should make a change. But those who stand nearest to a man between thirty-five and forty-five will be pretty sure to see the change, if they look for it. It shows itself more in his active powers; he becomes little by little less aggressive than he used to be. "Up to forty a man seeks pleasure, after forty he flies from pain," sings an observant poet; and a few weeks ago I heard the same sentiment confirmed in the conversation of a couple of electric car employees when one of them said to the other,

referring to a recent railway accident: "A man beyond forty ain't got no business to jump trains."

There is physical ground for the change. By this time the forces of growth are fairly expended; repair goes on but there is no enlargement. Under forty a weak heart may grow to compensate its weakness—so the doctors say; but after forty not; and this is true of the physical powers in general. A man is not now able to stand so easily either the hard work or the dissipation that he once could bear with ease. He is more apt to count the cost. And for this reason the most likely time for reform in drunkards is not in young manhood when their physical powers and courage are high, but in the early part of middle life (about forty-five, say) when their physical condition is beginning to deteriorate and they feel and foresee the full effects of excess.

But there are also mental causes. Up to thirty-five or forty a man feels, as I have said, that life is not all tried; that it may yet contain much that is new and delightful. He feels that he does not know his own powers fully; there may yet be capacities in him that he has not discovered and that may yet realize his dearest ambitions. Up to that time he has been exploring his social and intellectual world as a baby explores his physical world. By forty he knows it pretty well and has taken the measure of many things in it, especially of himself. The chances are large that he has tried something important and failed flatly, or he has had occasion to look back and estimate the small progress he has made in realizing his ideals of ten or twenty years before. He cannot hide from himself that many things of which he has been casually dreaming are entirely and forever out of his reach. He wakes up with a chilly feeling to the recognition that his boyhood is past and that what he is to do he must do quickly, and sees at the same time how extremely hard it will be for him to advance far beyond his present standard in originality of work, however much he may increase its quantity or erudition. Such a time of disillusionment, if it be acute, cannot be passed through without something of humiliation and mental pain—but as in the case of the other periods of transition, time brings the man through it.

The severity of the experience will depend on the temperament and on the circumstances of him who is undergoing it. Here as everywhere the chief preventive and antidote of personal disappointment and suffering is to be interested in something or somebody else. Disappointment and disillusionments come even then, but they have not the sting that makes foiled personal ambition so bitter. Those who are married and have children, have a great and natural advantage here. The man

who at forty has a family of children growing up around him finds his own ambitions transmuted by almost insensible gradations into ambitions for his children. As he learns his own limitations he lives again in their undetermined possibilities, and as Shakspeare says, "sees his blood warm when he feels it cold." But even if he is not so happily situated, time and good sense carry him through. He comes again to a happier view of life, content if he may succeed in doing well what yet remains for him to do, and finally settles down for the best twenty years of his life for intellectual work. In adaptation to his environment he is like the boy; he knows his world and his powers; and though he may work now with less ambition, he works with well-knit habits of industry and the experience and skill of a veteran. Now character is fixed, if it ever will be; the feelings are still strong, but restrained and concentrated; the will is firm; people take him seriously; he finds that he has influence—perhaps to his own great surprise at first. It is the age of the judge in Jaques's sketch. The man is *adultus adultissimus*. He is at the age in comparison with which all the rest are estimated.

*Period of the Elderly.*—Upon this period follows that of the elderly (55 or 60 to 70), the period in which physical decline is unmistakable. Intellectual vigor may survive (and as sometimes happens, much more than compensate the failure on the physical side), but a man must take care of himself; he must retire from positions demanding physical strength and must have a care that his body be able to support the demands of his mind. In intellectual matters, even, he may find that he must fight his indolence.

There are physical changes at about fifty-five or sixty that may serve to mark the beginning of the period—but I fancy that these are less generally noticed by the man himself and by his friends than are matters of another sort. A man may meet with a physical or mental shock from which he does not seem to recover fully, or he may find himself crowded out by younger men, or it be only that his children's children rise up and call him grandpa; but in some way the knowledge comes.

*Old Age.*—By seventy all the man's physical incapacities are emphasized. The bodily tissues that before have failed of proper nourishment, now begin to show signs of actual degeneration. Weight and height grow less, the skin is dry and wrinkled, the hair scanty and white, the gums without teeth, the body bent, the hand tremulous, the sense organs, one or more of them, out of full function. The cells of the nervous system show many of the appearances that characterize fatigue in younger people, and perhaps it would not be far wrong to read the feelings of the aged from one's own feelings when



nearly tired out. The mental marks are too great fixity of habit in thought, too little power of origination, and too little courage for new undertakings, a tendency (partly enforced by the exclusion of the aged from active participation in current affairs) to revert to the affairs of youth and early manhood, defective memory, defective powers of sustained effort. In many things the old man is like the child (what the child has yet to acquire the old man has lost) and needs much the same sort of attention. A natural timidity and sometimes decreased powers of judgment, lead to suspiciousness and sensitiveness. In its unhappy aspect it is as Jaques describes it: "Second childishness and mere oblivion, sans teeth, sans eyes, sans taste, sans everything." In its happier aspect it is the time of protected and lovingly tended rest, well earned after the labor of a lifetime.

It is natural to look upon this period of failing powers as one rather to be dreaded than longed for. Many a youth has settled it with himself that he would gladly forego life before reaching the decrepitude of forty years; and many a young man has thought the game would be hardly worth the candle after fifty. Many an old man also has found material for lamentation in the inevitable conditions of fourscore years.

But it is by no means necessary that old age should be wholly unhappy or terminate in "mere oblivion." More and more in our own day the old man is still active in his eighth decade. Gladstone comes naturally to mind as a striking example. Browning makes Rabbi Ben Ezra say:

"Grow old along with me!  
The best is yet to be,  
The last of life for which the first was made,"

and Cicero in his *Senectute* tells what he believes to be the secret of a happy old age, which is in substance to be content with the pleasures and employments that old age allows and thank the gods that one is not subject to the ills of other and earlier stages. A deeper insight finds the real secret of a happy old age once more in service for others carried on till the end of life—a service which on the one hand gives perennial interest to life by making the old man a participator in the life of all those about him, and on the other surrounds him with love in return—a love that finds in his weakness and even in his final childishness, if that comes to him, not a burden but an opportunity.

My time is exhausted and I have merely sketched the course of life for you. There is not time in a single hour to discuss also the theoretical questions that surround it, but I shall have time perhaps to emphasize further a single point of men-



tal hygiene. It is simply this: Cicero's advice to old men can easily be widened to fit all ages. If any one is to be happy he must find his happiness in the time and place in which he is, or like Alice in the Looking-Glass, he will find to his sorrow that there is always jam yesterday and jam to-morrow, but never jam to-day. And this again is but a special case of a yet wider precept. If you are to see beauty, or heroism, or romance, you must see them when and where you are, and in the things about you as they are. I do not mean that one is to see no ill in them; they are there, sometimes, apparently just to be improved; partly you must make your beauty for yourselves, but even for that you must be able to see and know it in its everyday clothes; you must live your lives where you happen to live. If you would let me, like Socrates in the *Phædrus*, make a prayer to the deity of the place before I depart, I should say: Grant unto me the seeing eye, that I may see the beauty in common things, that I may not miss a hero because he stands close to me, and that I may know that each age from first to last is good in itself and may be lived, not only well, but happily.

## LITERATURE.

*On the Association of Numerals.* By H. OERTEL. *American Journal of Psychology*, XII (3), 1901. 261-267.

In Thumb and Marbe's "*Experimentelle Untersuchungen über die psychologischen Grundlagen der sprachlichen Analogiebildung*" (Leipzig, 1901) the statement is made that, in experiments where the observer is required to react to spoken words by spoken words, the usual response to a number-word is some other number-word. In the article which forms the subject of this notice, Oertel cites certain observations on numerals, made in the course of an extended series of reaction experiments, whose results appear to him to traverse the rule laid down by Thumb and Marbe.

Oertel's method was to expose single printed words to the view of his observer. The time of exposure was regulated, so that the words were visible for just 5 sec. in each case. During this time, and during the 15 following seconds, the observer was required to form associations in his own mind, in connection with the stimulus word, and then to communicate them to the experimenter. It is clear that, during this long period, the thoughts of the observer would wander more or less widely from the word presented to him. Associations that seemed to be due, not to the stimulus word, but to later associated incidents or experiences, were struck out by Oertel from the introspective report. Thus one observer, to whom the word 'seven' was shown, writes as follows: 'This is a sacred number, because the week has seven days. Seven and eleven. It is a prime number.' Oertel strikes out the words 'because the week has seven days,' on the ground that they represent a secondary association. Surely, a curious procedure! If associations of this sort are to be ruled out, the obvious thing to do is to let the observer write out his introspection as soon as possible after the formation of the first association, or to ask him to record only the first association that forms. How is it possible, under the conditions of Oertel's experiments, to draw any sharp line of division between reactions evoked directly by the stimulus word, and reactions of other kinds,—seeing that the second and subsequent associations are always also dependent upon those that have preceded? It is plain that the procedure is arbitrary in the last degree.

Oertel found in these experiments, with ten observers, that although inwardly spoken numerals and visual images of numbers occurred now and again among the associations, still only in two cases did the seen number-words call up other, inwardly spoken number-words. One of these associated number-words was actually the eleventh of the associations evoked by the stimulus word. This result diverges so essentially, says Oertel, from the results obtained by Thumb and Marbe, that renewed investigation of the associations to number-words appears desirable. But Oertel, over and above his errors of experimental procedure, overlooks the fact that there is, *a priori*, not the least reason for expecting a coincidence of result in the two enquiries; they are concerned with totally different things. In the work of Thumb and Marbe, number-words were pronounced to the observer, and he was required to answer by speaking aloud. Oertel, on the other hand,

exposes printed number-words to his observers, and asks them to report upon the experiences which the words suggest. Thumb and Marbe expressly call attention (p. 14) to the fact that it is altogether inadmissible to transfer laws which hold for a determinate class of associations directly to another class: *cf.* also Meyer and Orth, *Zeits. f. Psych.*, XXXVI, 1. K. MARBE (University of Würzburg).

*Psychologie de la croyance.* Par C. BOS. Paris, F. Alcan, 1902. pp. 177. Price, fr. 2.50.

This essay falls into two parts: an historical study, and a psychological analysis of belief. The author finds that the conflict between science and faith is apparent only; science presupposes belief, indeed, rests upon belief at every point. Belief, faith, is coextensive with life; it is the affirmation of our will to live. The psychological growth of belief is traced, from that which is implied in mere sensation up to that which involves a deliberate volition. The motives to faith are discovered in the deepest and most intimate recesses of organized life; it is the total self, the psychophysical union of mind and body, that believes.

*W. Wundt's Philosophie und Psychologie.* In ihren Grundlehren dargestellt von R. EISLER. Leipzig, J. A. Barth, 1902. pp. vi, 210. Price Mk. 3.20.

This is a clear and for the most part sympathetic account of Wundt's philosophical work, appearing opportunely on the eve of the Master's seventieth birthday. It falls into three parts: psychological principles, epistemological principles, and metaphysical principles (the latter including general metaphysics, philosophy of nature, and philosophy of mind). The book is a useful supplement to that already published by E. König in the series known as *Frommann's Klassiker*; we note in particular that Eisler lays especial stress upon epistemology, as König does upon ethics. The volume concludes with a partial bibliography. There is no index.

*Magic and Religion.* By ANDREW LANG. New York & Bombay, Longmans, Green & Co., 1901. pp. x, 316.

This book has two principal theses: the one positive, that "perhaps the earliest traceable form of religion was relatively high, and that it was inevitably lowered in tone during the process of social evolution;" the other negative,—a destructive criticism of Frazer's "many hypotheses, which are combined into his theory of the origin, or partial origin, of the belief in the divine character of Christ," and of the same author's "theory of the Golden Bough of Virgil as connected with the fugitive slave who was 'King of the Wood' near Aricia." On the former count, the impression left upon the reader's mind is that there is a good deal more to be said for Mr. Lang's theory than current modes of anthropological thinking and writing would lead one to suppose; on the second,—that Mr. Frazer has been pulverized. The final settlement of the controversy must be left to the anthropologists. In the meantime, Mr. Lang's psychology is generally sound, and his style, as always, is charming.

*Dreams and their Meanings: with many accounts of experiences sent by Correspondents, and two chapters contributed mainly from the Journals of the Psychical Research Society on telepathic and premonitory dreams.* By H. G. HUTCHINSON. London, New York & Bombay, Longmans, Green & Co., 1901. pp. 320.

"It occurred to me," writes the author in his Introduction, "that there were certain kinds of dreams common to nearly every one. . . And this being so, I was struck by the fact that no one seemed to have

tried to find the common cause of each kind respectively of familiar dreams." He therefore set himself to investigate the subject, with the present volume as a result.

The valuable part of the work, to the psychologist, is the long (over 100 pp.) chapter on the Classification of the More Frequent Dreams. For the rest, the book is avowedly 'popular;' and the chapters on 'What Science has to Say about Dreams,' 'Their Association with Ideas of Immortality,' 'Divinations from Dreams' and 'Interpretations' are slight and sketchy. The two concluding chapters deal with the topics mentioned in the sub-title.

*Facts and Comments.* By HERBERT SPENCER. New York, D. Apple & Co., 1902. pp. viii, 292. Price \$1.20.

"During the years spent in writing various systematic works," says the author in his Preface, "there have from time to time arisen ideas not fitted for incorporation in them. Many of these have found places in articles published in reviews, and are now collected together in the three volumes of my essays. But there remain a number which have not yet found expression: some of them relatively trivial, some of more interest, and some which I think are important. I have felt reluctant to let these pass unrecorded, and hence during the last two years, at intervals now long and now short, have set them down in the following pages. Possibly in a second edition I shall make some small additions, but, be this as it may, the volume herewith issued I can say with certainty will be my last."

The book contains no less than thirty-nine sections, covering the widest range of interest. Seven of these (State Education, Patriotism, Party Government, Imperialism and Slavery, Re-barbarization, Regimentation, The Reform of Company Law), may be classed roughly under the heading of political philosophy; a few have direct reference to previous works,—so the Regressive Multiplication of Causes to *First Principles*, Some Light on Use-Inheritance to the *Principles of Biology*, Style to the essay on *The Philosophy of Style* ("the editor's title, not mine"), and The Origin of Music and Developed Music to the essay on *The Origin and Function of Music*. Psychology is touched upon in A Problem (obsession by melodies), Presence of Mind, Feeling vs. Intellect (one of the most important 'comments' in the book), The Closing Hours (consciousness in the dying), and Exaggerations and Misstatements (criticism of Huxley). The rest vary all the way from Ultimate questions, and What should the Sceptic say to Believers? to designs for painlessly disposing of lost dogs and for improving the acoustical properties of music rooms. It need hardly be said that there are many wise sayings, and many characteristically Spencerian sayings in the volume. "I detest that conception of social progress which presents as its aim increase of population, growth of wealth, spread of commerce:" so do many of us. "The primary purpose of music is neither instruction nor culture but pleasure; and this is an all-sufficient purpose:" this is like Wundt's theory of the function of æsthetics as the play of the adult. "Beauty is not attained by filling a room with beautiful things:" so one might quote at large. Very important is the statement of the part that use-inheritance plays and does not play in the author's Psychology (p. 149). And very characteristic of Spencer's contempt for history are the opening sentences of Perverted History: "I believe it was a French King who, wishing to consult some historical work, called to his librarian: Bring me my liar. The characterization was startling, but not undeserved."

The passing of Herbert Spencer from the literature of English philosophy is an event that no one, friend or foe, can contemplate without sadness. Let us hope that he may live long enough to publish a second and many more editions of *Facts and Comments*!

*Psychologie du rire.* Par L. DUGAS. Paris, F. Alcan, 1902. pp. vii, 178. Price fr. 2.50.

M. Dugas, after setting forth the inadequacy of our present psychology of laughter, discusses in detail two forms of theory: that which treats of laughter qualitatively, in terms of the emotions and feelings which it expresses, and that which treats of it quantitatively, in terms of the amount of nervous energy which these various feelings and emotions release. He concludes that laughter is in every case an accident, an epiphenomenon. It is an expression of individuality, and consequently manifests as many forms as there are different types of mind or states of consciousness. Hence no single theory is possible. On the practical side, laughter may be an object of desire or aversion, but cannot be an end, an object of volition.

*Causeries psychologiques.* Par J. J. van BIERVLIET. Gand, A. Siffer; Paris, F. Alcan. N. d. pp. 165. Price fr. 3.00.

The author here brings together three popular and brightly written articles on psychological subjects. The first, *L'envers de la joie et de la tristesse*, deals chiefly with the James-Lange theory of emotion and with the views of Dugas and Fleury; the second, *Le problème de la mémoire en psychologie expérimentale*, devotes most space to the work of Ribot, Bourdon, Binet and V. Henri; the third, *Les formes de passage en psychologie*, seeks to show the relation between the normal condition of the mind and certain well-marked pathological phenomena, such as hallucination, suggested movement, and double personality.

*A History of English Utilitarianism.* By E. ALBEE. London, Swan Sonnenschein & Co.; New York, The Macmillan Co., 1902. pp. xvi, 427.

Professor Albee has produced a notable work, and one which will be of high value to psychologists as well as to students of philosophy proper. Hitherto we have had no history of English ethics worthy the name: Whewell's *Lectures* of 1852 are hasty and controversial; Sidgwick's *Outlines* (1886) gives only about 100 pp. to English ethics; and other 'outlines,' such as the sketch in Wundt's *Ethics*, are still more condensed. Dr. Albee's chapters discuss Cumberland (2), Shaftesbury and Hutcheson, Berkeley, Gay and Brown, Hume, Hartley, Tucker (2), Paley and Bentham, John Mill (3), Herbert Spencer (3), and Henry Sidgwick (3). It is a pity that so good a book should not be better printed.

*The Ethic of Freethought and other Essays and Addresses.* By KARL PEARSON, F. R. S. Second edn., revised. London, A. and C. Black; New York, The Macmillan Co., 1901. pp. xiii, 431.

*The Grammar of Science.* By KARL PEARSON. Second edn., revised and enlarged, with 33 figures. London, A. and C. Black, 1900. pp. xvii, 548.

We are glad to call attention to these new editions of Professor Pearson's works. Neither of the books before us has undergone any substantial change, though both have been thoroughly revised by the author. The *Grammar* contains two additional chapters, dealing with fundamental conceptions in the field of biological science: ch. x, *Evolution: Variation and Selection*; ch. xi, *Evolution: Reproduction and Inheritance*. It need hardly be said that the works are standard in their respective fields.

*Die wissenschaftlichen Grundlagen der Graphologie.* By G. MEYER. Jena, G. Fischer, 1901. pp. 81, with 31 plates.

This work attempts to correlate handwriting and character, on the

ground of three principles: those of involuntary motor tendencies, of the ideal copy (*Leitbild* or *Zielbild*), and of the parallelism of the activity of writing with the associative activity at large. The author makes full use of modern psychological literature, and does his best with a topic which is certainly not yet 'spruchreif.'

*La psychologie du rêve, au point de vue médical.* By N. VASCHIDE and H. PIERON. Paris, J. B. Baillière et Fils, 1902. pp. 96. Fr. 1.50.

The thesis of this little book is that the dream is a valuable source of information not only of our mental but also of our bodily condition, and should therefore take its place among diagnostic symptoms. Not only nervous pathology, but pathology in general (typhoid fever, intestinal, cardiac and pulmonary affections) may make good use of it. Special attention is given to the rôle of dreaming in the insane consciousness, and in hystericals and epileptics. The treatment is practical, and many records of cases are given.

*Anleitung beim Studium des Baues der nervösen Centralorgane im gesunden und kranken Zustande.* By HEINRICH OBERSTEINER. Vierte, vermehrte und umgearbeitete Auflage, mit 250 Abbildungen. Leipzig und Wien, F. Deuticke, 1901. pp. xvii, 680.

The first edition of this standard work was published in 1887, and within a few years it had been translated into English, French, Italian and Russian. In face of this general recognition, the reviewer's task is easy. We need only say that the present edition is thoroughly up-to-date, and that the author has in many places simplified and clarified his exposition.

*Fragments of Philosophy and Science, being Collected Essays and Addresses.* By J. M. BALDWIN. New York, Chas. Scribner's Sons, 1902. pp. xii, 389. Price \$2.50 net.

In this volume Professor Baldwin has brought together articles, essays, reviews, etc., published by him in various magazines during the past fifteen years. "It is thought worth while to gather them together because—and the selections are made with view to this—they are related to larger topics on which I have published more extensively—or intend to—in separate works." There is no new matter in the text, but an attempt has been made to bring the book up to date by means of foot-note references.

*Thomas Henry Huxley.* By E. CLODD. New York, Dodd, Mead & Co., 1902. pp. xiii, 252. Price \$1.00 net.

This is an accurate and very readable sketch of Huxley's life and work. It owes much to L. Huxley's *Life and Letters*, as any future biography must do; but the material has been recast by the writer in attractive literary form.

*Kant's Prolegomena to Any Future Metaphysics.* Edited in English by Paul Carus. The Open Court Publishing Co., Chicago, 1902. pp. 301.

Although this translation is practically new, the efforts of Mahaffy, Bernard, Richardson and Bax are considered. To it are appended a convenient chronology of Kant's life and publications, and an index.

*Leibniz Discourse on Metaphysics, Correspondence with Arnauld and Monadology.* Translated by George R. Montgomery. The Open Court Publishing Co., Chicago, 1902. pp. 272.

These three treatises of Leibniz give a convenient survey of his philosophy in its genesis and final form. The first was written when he

was forty and was not published during his life, and the monadology appeared two years before his death. Only the monadology has never before been translated.

*Outlines of Metaphysics*, by JOHN S. MACKENZIE. Macmillan and Co., London, 1902. pp. 172. Price, \$1.10.

This small book, dedicated to Edward Caird, deals well with a great subject. The genesis of experience and the criticism of ideal constructions of various kinds constitute the leading themes, under which the special topics are—the general nature of experience; method and theories of metaphysics; sensation, perception, thought; ethical, æsthetic, religious, and speculative constructions.

*Boethius's Consolation of Philosophy*. Translated by W. V. Cooper. (The Temple Classics.) J. M. Dent and Co., London, 1902. pp. 175.

This tasteful little book is the first attempt at a twentieth century version of this work, the first translation of which was made by Alfred the Great.

*Die Wirkungen des heiligen Geistes, nach der populären Anschauung der apostolischen Zeit und der Lehre des Apostels Paulus*, von HERMANN GUNKEL. Göttingen, 1899. pp. 109.

This monograph is an admirable work with characteristic German thoroughness and written with abundant references to the available literature upon the subject.

*The Problem of Consciousness in its Biological Aspects*, by CHARLES SEDGWICK MINOT. Reprinted from Science, July 4, 1902, Vol. 16, pp. 1-12.

The strict neurologists will, of course, refuse to follow the author in his chief lines of argument. Perhaps they will more strenuously object to the view that conscious actions are primary, and reflex and instinctive actions secondary. The germs of consciousness may very likely run down to the very lowest living organisms, but to prove that it is so commanding a factor in evolution, as the author assumes, is at present entirely impossible. In our humble opinion, our leading biologists like Whitman, Minot, and especially Brooks, who are becoming interested not only in psychological but in the epistemological theories, would render a better service for science by contributing to the comprehensive study of not only functions but the habits and life histories of animals which this author so well desires. If those to whom we look for the study of life are to divert themselves to formulating "dollish ideas" concerning the nature of consciousness—the most slippery and indefinite of all metaphysical conceptions—we are certainly in a bad way. If those who have spent their lives in tracing forms of microscopic tissues desire or need in fulfilment of some great law of human nature to enter a larger and more humanistic or psychic field, let them guide us psychologists in the study of the instincts of animals. If the current rage in certain philosophical quarters for analyzing ultimate reality—a passion now happily in a rapid stage of decline in the departments where it sprang—is to infect biologists, it will have another grievous sin to answer for.

*Von der Nervenzelle und der Zelle im Allgemeinen*, von PAUL KRONTHAL. G. Fischer, Jena, 1902. pp. 274.

The first part treats the biology of the nerve cell with chapters on staining and fixation and contains nine full page plates with description, on which the author bases his own interesting conclusions. The most important of these are that the leucocytes are the source from which the nucleus derives its chromatic substances; that the larger



cells in the anterior horn of the cord as well as in the gray matter of the brain are found in very different conditions in healthy persons; nerve cells never divide even in the embryo; they decay and arise by the fusion with leucocytes anew.

The second part of the book treats of the cell in general and of nerve cell in particular. It is an elementary organism arising from formed and unformed materials and must contain nutritive matter which is unformed. The living substance in its relation to the cell; the difference between protoplasm and nucleus bioids; how the cell takes and works up matter; why it is not an organism or a cell at all in a biological sense; how the phenomena we see in the cell are the effects of outer forces, are treated, with final chapters on heredity and death.

*Das Problem der Willensfreiheit in der neuesten deutschen Philosophie*, von LEO MÜFFELMANN. J. A. Barth, Leipzig, 1902. pp. 115.

On the basis of a critical examination of the chief modern literature upon the question of freedom which itself gives this pamphlet great value, the author finds as a result of his analysis that the solution of the problem is simple and is determinism. A bibliography of the most recent literature upon the subject closes the volume.

*Deuxième Congrès International de L'Hypnotisme Expérimental et Thérapeutique tenu à Paris du 12 au 18 Août 1900.* Vigot Frères, Paris, 1902. pp. 320.

One of the most interesting articles here is Bérillon's history of experimental hypnotism with photographs of Braid, Durand de Gros, Liebeault, Mesnet, Richet, Luys, Charcot, Paul Richer, Pitres, F. Raymond, Dumoutpallier, Paul Magnin, Jules Voisin, and finally Bérillon himself with several views from his clinic. The important articles are by Vogt on the value of hypnotism as a means of psychological investigation; by Lemesle and others on hypnotism from a medico-legal point of view; Crocq on its relations to hysteria; and by Bérillon on its applications to pedagogy and mental orthopedics.

*Kathlamet Texts*, by FRANZ BOAS. Smithsonian Institution Bureau of American Ethnology, Bulletin 26. Govt. Print, Washington, 1901. pp. 261.

The texts in this volume were all told by one person, Charles Cul-tée, who is one of only three who speak the Kathlamet dialect. The text is given on the upper part of the page in coherent English; the original language is printed below with literal interlinear translations.

*L'Année Philosophique* (F. Pillon) 12th year, 1902. F. Alcan, Paris, 1902. pp. 312.

The leading articles in this volume are by Brochard on the work of Socrates; by Hamelin on the logic of the Stoics; by Robin on Aristotle's psychology; by Dauriac on the category of being; and by Pillon on Bayle's critique of Descartes's theism. The bibliography of French philosophy for 1901 covers pages 155-309.

#### NOTE.

On August 16 Professor Wundt celebrated his seventieth birthday. A *Festschrift* comprising some forty original articles by his former pupils was presented to him on this occasion by an international deputation, consisting of Professors E. Kraepelin, O. Kuelpe, A. Kirschmann, F. Angell, E. Meumann and Dr. W. Wirth. The *Festschrift* will be published as two extra volumes of the *Philosophische Studien*, each of about 750 pp.